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Clinical Profile and Hepatic Dysfunction Pattern in Paediatric Dengue Infection: A Prospective Study from Bundelkhand Region of Central India

Sanjay Kumar Yadav, Anuj Shamsher Sethi, *Dharmendra Kumar Yadav, *Ajeet Kumar Yadav, RS Sethi, Om Shankar Chaurasiya, Dwijendra Nath, **Chandra Prakash Yadav
*Department of Peadiatrics, MLB Medical College, Jhansi, UP, Indian, *Super Speciality Cancer Institute and Hospital, Lucknow, UP, India, **Department of Biostatistics, National Institute of Malaria Research, Indian Council of Medical Research, New Delhi, India

ABSTRACT

Dengue is a common vector-borne disease, affecting all age groups resulting in significant morbidity. Hepatic dysfunction in pediatric dengue infection ranges from mild transaminitis to acute liver failure. This led us to study clinical profile and pattern of hepatic dysfunction in paediatric dengue infection of Bundelkhand region of India. This prospective study was conducted during June 2017 to October 2018. Study participants were enrolled and classified in three groups as per WHO 2009 classification. Clinical profile and laboratory parameters were recorded. Data were analyzed using STATA 15.0.

We enrolled 50 cases and classified them in dengue without Warning sign (WS) 21(42%), dengue with WS 24(48%) and severe dengue 5(10%). Commonest presenting symptom and sign were fever (100%) and hepatomegaly (42%) respectively. Pain abdomen, mucosal bleeding and hepatomegaly were significantly more in dengue with WS (p value<0.001, 0.006 and <0.001 respectively). Gastrointestinal bleeding, neurological symptoms and shock were significantly present in severe dengue (p value <0.001 for all). Hemoglobin, hematocrit, serum protein were significantly decreased in severe dengue (p value- 0.012, 0.007 and 0.023 respectively). However, Total leucocyte count, Prothombin Time and Activated Partial Thromboplastin Time were significantly elevated (p value 0.008, 0.012 and 0.0223 respectively). Mean serum transaminases were elevated in all groups and were comparable. Elevated serum transaminases were recorded in in all patients with dengue infection; however these laboratory findings do not differentiate between severe and non-severe dengue infection.

KEYWORDS: dengue, hepatic dysfunction, hepatomegaly

INTRODUCTION:

Dengue is an important vector-borne arboviral infection, which has emerged as a major public health problem worldwide and mostly endemic in tropical and subtropical countries including India[1].

In India, dengue is endemic to almost all states and a major cause of hospitalization in rainy and post-rainy season. Despite of all preventive measures, numbers of dengue cases have increased from 1,01,192 in 2018 to 1,36,422 till November 2019 with relative decline in number of deaths from 172 to 132

respectively[2]. Major demographic changes such as uncontrolled population, unplanned urbanization, substandard housing and poor water drainage has facilitated vector proliferation.

Dengue is caused by Dengue virus (DEN), which is single, stranded RNA virus belonging to Flaviviridae. There are five serotypes namely DEN-1, DEN-2, DEN-3, DEN-4 and DEN-5 have been isolated till now. Transmission is mostly by Aedes aegypti mosquitoes and Aedes albopictus is secondary vector which has characteristics of being highly adaptive and can survive in cooler climates too. All serotypes/ genotypes are now circulating globally and maintaining hyperendemicity. DEN-2 viral infection has propensity to cause severe signs and symptoms. DEN-2 and DEN-3 have been mostly linked with dengue hemorrhagic fever. Infection by one serotype provides lifelong immunity to that serotype, but gives transient and partial protection to other serotypes.

Corresponding Author:
Dr Ajeet Kumar Yadav
Assistant Professor,
Department of Peadiatrics,
Super Speciality Cancer Institute and
Hospital, Lucknow, UP, India
Phone No.: 8865078844
E-mail: ajeet17llrm@gmail.com

Sequential infection with different serotypes increases risk of severe dengue.

As Per WHO 2009 classification, dengue fever has been classified as: (i) dengue without warning signs(WS), (ii) dengue with WS and (iii) severe dengue. Dengue infection is frequently confounded with other febrile illnesses (OFI), presenting with non-specific clinical symptoms analogous to OFI. During the early course of dengue infection, presence of nonspecific febrile illness makes precise diagnosis strikingly difficult, resulting in inefficient treatment and possible increases in morbidity and mortality. Severe dengue, if not appropriately managed, may lead to rapid death, particularly in children. In addition, the lack of necessary laboratory facilities, particularly in remote/ rural areas may cause difficultly in discriminating dengue infection from OFI.

Diagnosis of dengue by virus isolation has been the traditional and definitive diagnostic method for detecting DENV infection; however it is not practical as testing result may take days to weeks. So, gradually it was replaced by Real time- polymerase chain reaction (RT-PCR) and now more recently, by Non Structural Protein1 Antigen (NS1Ag) captured enzyme-linked immunosorbent assays (ELISAs) and Immunoglobulin M antibody (IgM Ab) ELISAs for more rapid diagnosis. These are principal diagnostic modalities in endemic countries because of their cost-effectiveness and higher sensitivity and specificity. NS1 Ag has a sensitivity of around 80% and specificity of 99- 100%[3].

Studies have been done on various aspects of dengue infection across the world and India. However, there is paucity of data regarding paediatric dengue infection from Bundelkhand region of central India. Hence, this research was conducted to study the clinico-epidemiological aspects and profile of hepatic dysfunction in children with dengue infection from this region.

MATERIALS AND METHODS:

After getting approval from Institutional Ethical Committee, this hospital based prospective observational study was conducted during June 2017 to October 2018 in the Department of Pediatrics of Maharani Laxmi Bai Medical College, a tertiary care teaching institute in Jhansi, Uttar Pradesh, India.

All laboratory confirmed Dengue fever (either IgM or NS1Antigen or both positive) patients between ages 1 month to 18 years, getting admitted in this department were enrolled as study participants after getting an informed written consent. We excluded patients aged >18 years, patients with pre-existing liver disease, patients with bleeding disorders and patients not willing to be a part of this study.

Predesigned, pretested proforma was used by primary investigator to collect data, which includes patient's particulars: name, age, sex and date of hospitalization; clinical symptoms at presentation like fever, headache, bodyache, joint pain, rashes, pain abdomen, vomiting, bleeding manifestation (epistaxis, gum bleeding and malena) abnormal movements or altered sensorium; detailed physical signs like circulatory status (presence or absence of shock), pallor, icterus, petechiae, organomegaly (hepatomegaly and/or splenomegaly), ascites, pleural effusion and laboratory parameters at admission like NS1Ag, IgM Dengue, hemoglobin (Hb), hematocrit (HCT), total leukocyte count (TLC), platelet count (PC), serum bilirubin (S. bil.), S. alanine transferase (ALT), S. aspartate transaminase (AST), S. alkaline phosphatase (ALP), prothombin time (PT), activated partial thromboplastin time (aPTT), S. protein and S. albumin. Shock was defined as, if the pulse pressure (i.e. the difference between the systolic and diastolic pressures) was ≤ 20 mm Hg in children or he/she had signs of poor capillary perfusion (cold extremities, delayed capillary refill, or rapid pulse rate)[3].

` Study participants were categorized as dengue without WS , dengue with WS and severe dengue as per WHO 2009 Classification. Warning signs include abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleed, lethargy or restlessness, liver enlargement >2 cm and laboratory parameter i.e. increase in HCT concurrent with rapid decrease in platelet count. Severe dengue includes (a) severe plasma leakage leading to shock or fluid accumulation with respiratory distress (b) severe bleeding as evaluated by clinician and (c) severe organ involvement of liver (AST or ALT ≥1000), neurological system (impaired consciousness) and heart or other organs.

Data was entered in Microsoft excel sheet 2007 and analyzed using software STATA 15.0 (StataCorp). Pearson chi-squared test ($\chi 2$) was applied for categorical data to look for any significance. Analysis of variance (ANOVA) and Kruskal Wallis tests were used for comparing different explanatory variables among three categories of outcome variable as per their distribution. Post-hoc analysis was done using Bonferroni test for normally distributed variables while rank-sum test with adjusted level of significance was used for the variables which did not

follow the normal distribution. p-value <0.05 was considered as statistically significant. Study was discontinued when predefined study period was over.

RESULTS:

Total 85 patients of acute febrile illness were assessed for eligibility, 35 patients were excluded with different reasons [Figure:1] and 50 study participants were included and classified into dengue without WS in 21 (42%), dengue with WS in 24 (48.0%) and severe dengue in 5 (10%). Mean age of enrolled participants were comparable in all three groups and majority of them 22 (44%) were in the age group of 5-10 years. 56% of the cases were boys.

All study participants had fever as presenting complaint. Other common symptoms were abdominal pain 34 (68%), headache 24 (48%), vomiting 20 (40%) and rashes 15 (30%) [Table-1]. Bodyache was significantly more in dengue without WS (p value- 0.022). However, pain abdomen and skin/mucosal bleeding were significantly more in dengue with WS (p value- <0.001 and 0.006 respectively). Gastrointestinal bleeding, altered sensorium and abnormal movements were significantly more in severe dengue (p value- <0.001, <0.001 and <0.001 respectively). Most common physical sign was hepatomegaly in 21 (42%). Shock was significantly more in severe dengue group (p value- <0.001) while icterus and hepatomegaly were significantly more in dengue with WS (p value- <0.049 and <0.001 respectively). Remaining clinical parameters were comparable in all three groups [Table: 1].

In lab parameters, mean Hb and mean HCT in dengue without WS was comparable with dengue with WS and severe dengue; however, theses parameters were significantly lower in severe dengue than dengue with WS (p value- 0.013 and 0.006 respectively). Mean TLC in dengue without WS group and dengue with WS group was comparable (p value-1.000); however, it was significantly elevated in severe dengue group, as compared to dengue without WS and dengue with WS group (p value- 0.010 and 0.008 respectively). S. proteins were significantly higher in dengue with WS group (p value- 0.023) [Table: 2]. PT and aPTT were significantly elevated in severe dengue (p value- 0.012 and 0.022 respectively). Remaining lab parameters like Mean S. AST, S. ALT, mean PC, S. bilirubin and S. ALP were comparable in all three groups.

DISCUSSION:

In this study, we analyzed 50 study participants; out of which 45 (90%) were categorized as nonsevere dengue which included both dengue fever with and without warning signs and 5 (10%) were severe dengue, similar to study by Tamibmaniam et al who noted lower prevalence of severe dengue (9%)[4]. Fewer number of severe dengue cases can be attributed to access to health facility, early detection of disease progression and ensuring close observation.

In the present study, boys and girls were almost equally affected with 56% and 44% of total cases respectively. It was in accordance with previously reported data by Rose et al[5]. Children in age group of 5-10 years constituted almost half of dengue cases (44%) which is in accordance to study by Kulkarni et al, where 45.8% cases were in 6-12 yrs of age group[6].

Commonest presenting symptom was fever (100%) followed by headache (46%) and rashes (30%). Bodyache (23.81%) was exclusively and significantly present in dengue without WS (p value- 0.022) similar to study by Rathore et all where myalgia was reported in 27.33% cases[7]. However, a higher incidence of body ache (79.20%) has been reported by Gupta et al have in a study of 48 dengue patients[8].

Warning sign like abdominal pain was present in 46% of cases which was comparable to earlier studies having an incidence of 30 to 55%. Abdominal pain was significantly present in dengue with WS (79.16%) and severe dengue (80%) (p value- <0.001), which was similar with the findings of Roy et al for severe dengue (79.4%) but, with a lower incidence in dengue with WS group (21.9%). Vomiting was present in 20 (40%) cases, similar to incidence reported by Rathore et al[7].

Mucosal bleed (epistaxis/gum bleeding) was significantly more in dengue with WS group (p value- 0.006). However, severe (GI) bleeding was significant finding in severe dengue group (p value- <0.001) similar to study by Mishra et al[9]. Neurological manifestations like abnormal movements 3 (60%) and altered sensorium 4 (80%) was seen only in severe dengue group (p value <0.001 and <0.001 respectively). Petechiae were present in 26% of all cases similar to 22.1% in study by Mishra et al[9].

Hepatomegaly (42%) was commonest physical sign noted in our study, which is in accordance with the findings reported by Mishra et al. Hepatomegaly in children with dengue infection has been reported in 43-100% of cases in similar studies[10]. Incidence of hepatomegaly was higher in severe dengue as compared to dengue with WS group, similar to studies by Wahid et al and Wichman et al

Table 1: Clinico-demographic profile of study participants.

Variables	Dengue without WS Group I $^\$$n=21 (%)	Dengue with WS Group II $^\$$n= 24 (%)	Severe Dengue Group III $^\$$n=5 (%)	p-value
Baseline characteristics				
Male	12 (57.14%)	13 (57.17%)	3 (60%)	0.963
Age (Years)*	9.55 ±4.68	9.81 ±3.84	8.72 ±4.80	0.873
Dengue serology				0.123
NS1 Antigen	13 (61.90%)	9 (37.50%)	0 (0%)	
IgM Dengue	5 (23.81%)	8 (33.33%)	3 (60%)	
NS1 & IgM	3 (14.29%)	7 (29.17%)	2 (40%)	
Clinical Symptoms				
Fever	21 (100%)	24 (100%)	5 (100%)	NA
Headache	9 (42.86%)	13 (54.17%)	1(20%)	0.352
Rashes	7 (33.33%)	7 (29.17%)	1(20%)	0.836
Pain abdomen	0 (0%)	19 (79.17%)	4 (80%)	<0.001
Vomiting	10 (47.62%)	9 (37.50%)	1 (20%)	0.496
Joint pain	2 (9.52%)	0%(0)	0%(0)	0.237
Bodyache	5 (23.81%)	0%(0)	0%(0)	0.022
Mucosal Bleed	0 (0%)	8 (33.33%)	0 (0%)	0.006
Gastrointestinal bleeding	0 (0%)	0 (0%)	3 (60%)	<0.001
Altered sensorium	0 (0%)	0 (0%)	4 (80%)	<0.001
Abnormal movement	0 (0%)	0 (0%)	3 (60%)	<0.001
Physical signs				
Shock	0 (0%)	0 (0%)	5 (100.0%)	<0.001
Pallor	8 (38.10%)	5 (20.83%)	3 (60%)	0.171
Icterus	1 (4.76%)	7 (29.17%)	0 (0%)	0.049
petechiae	3 (14.29%)	7 (29.17%)	3 (60%)	0.099
Hepatomegaly	0 (0%)	12 (50%)	3 (60%)	<0.001
Ascites	0 (0%)	4 (16.67%)	0 (0%)	0.095
Spleen	2 (9.52%)	0 (0%)	0 (0%)	0.237
Pleural effusion	0 (0%)	2 (8.33%)	0 (0%)	0.324

$^\$$n – number of participants, *Age expressed as mean±SD.

who reported higher incidence of hepatomegaly in DHF and DSS respectively as compared to non-severe dengue fever[11,12]. However, study by Roy et al reported higher incidences in dengue with WS (84.4%) and severe dengue (93.1%)[13]. Icterus was observed significantly more in dengue with WS (29.1%) (p value- 0.049).

All cases in severe dengue (100%) presented with shock (p <0.001), similar to study by Roy et al–(13). Mean Hb and HCT were comparable between dengue without WS vs dengue with WS and dengue without WS vs. severe dengue; however, it was significantly low in severe dengue as compared to dengue with WS (p value- 0.013 and 0.006 respectively). Apparent elevation in mean Hb and

HCT in dengue with WS group can be explained with hemoconcentration because of fluid leak; however fall in severe dengue can be attributed to severe bleeding.

Elevated hepatic enzymes have been reported in dengue patients by various researchers, ranging from 36.4% to 96% in different pediatric and adult studies. In our study, we observed that AST was higher than ALT, similar to previous reported studies[9,13]. Elevated AST levels can be attributed to dengue infection induced damage to non-hepatic tissue. Prolonged PT and aPTT in severe dengue was in accordance with Roy et al where they reported prolonged INR in place of PT; however Jagdishkumar et al reported only significantly pronged INR in

Table 2: Laboratory parameters of study participants

Lab parameters	Dengue without WS [Group I]*	Dengue with WS [Group II]*	Severe Dengue [Group III]*	p-value	$Post hoc pair wise comparison Group I vs Group II	Group I vs Group III	Group II vs Group III
Hb (gm/dl)	9.76 ±2.14	10.73 ±1.81	7.88 ±1.46	0.012	0.307	0.169	0.013
TLC(cells/mm³)	5678.57 ±5215.95	5561.25 ±3779.57	12700.0 ±5134.69	0.008	1.000	0.010	0.008
PCV (%)	29.42 ±7.75	32.27 ±6.50	21.14 ±3.98	0.007	0.520	0.060	0.006
PC(lac cells/mm³)	0.72 ±0.30	0.59 ±0.30	0.62 ±0.18	0.324			
S. bil. (mg/dl)	0.74 ±0.36	1.19 ±0.91	1.52 ±1.41	0.069			
S. bil (direct)	0.46 ±0.22	0.75 ±0.61	0.92 ±0.86	0.085			
AST (IU/ml)	111.98 ±112.16	153.37 ±128.44	202.60 ±110.78	0.258			
ALT(IU/ml)	94.90 ±101.59	94.70 ±79.85	116.94 ±73.24	0.871			
S. ALP (IU/ml)	313.52 ±113.08	376.21 ±128.43	363.68 ±177.20	0.257			
PT (sec)	13.77 ±2.27	16.03 ±6.60	23.90 ±14.97	0.012	0.756	0.009	0.054
APTT (sec)	26.11 ±6.06	33.65 ±14.80	41.52 ±17.24	0.022	0.131	0.043	0.585
S.protein (gm/dl)	6.28 ±0.93	6.49 ±1.13	5.01 ±1.17	0.023	1.000	0.060	0.019
S. albumin(gm/dl)	3.82 ±0.74	3.98 ±0.96	2.97 ±0.87	0.069			

*Data expressed as mean±SD, $Post hoc pair wise comparison, if p value was <0.05

children with dengue shock syndrome[14]. Mechanisms of hepatic injury in dengue infection could be either direct effects of the virus or host immune response, circulatory compromise, hypoxia, metabolic acidosis or localized vascular leakage inside liver, hepatotoxic drugs and tissue tropism of particular viral serotypes or genotypes.

We observed significant hypoproteinemia in severe dengue group as compared to non-severe dengue (p value-0.023). Observations of serum albumin was similar to findings reported by Jagdishkumar et al and findings of hypoproteinemia was similar to study by Prasad et al except for S. albumin which was significantly decreased in severe dengue group[15].

LIMITATION OF THE STUDY:

Only laboratory confirmed dengue cases were included. Sample size was small. Findings of deranged liver function was not adjusted for the presence of other co-infections in this region like malaria, enteric fever and chikungunya, having propensity to cause hepatitis.

CONCLUSION:

We conclude that, spectrum of hepatic involvement in dengue infection ranges from elevation of liver enzyme to clinical jaundice to acute liver failure. Hepatomegaly is a most important physical sign. Child presenting with fever, hepatomegaly and altered liver function, possibility of
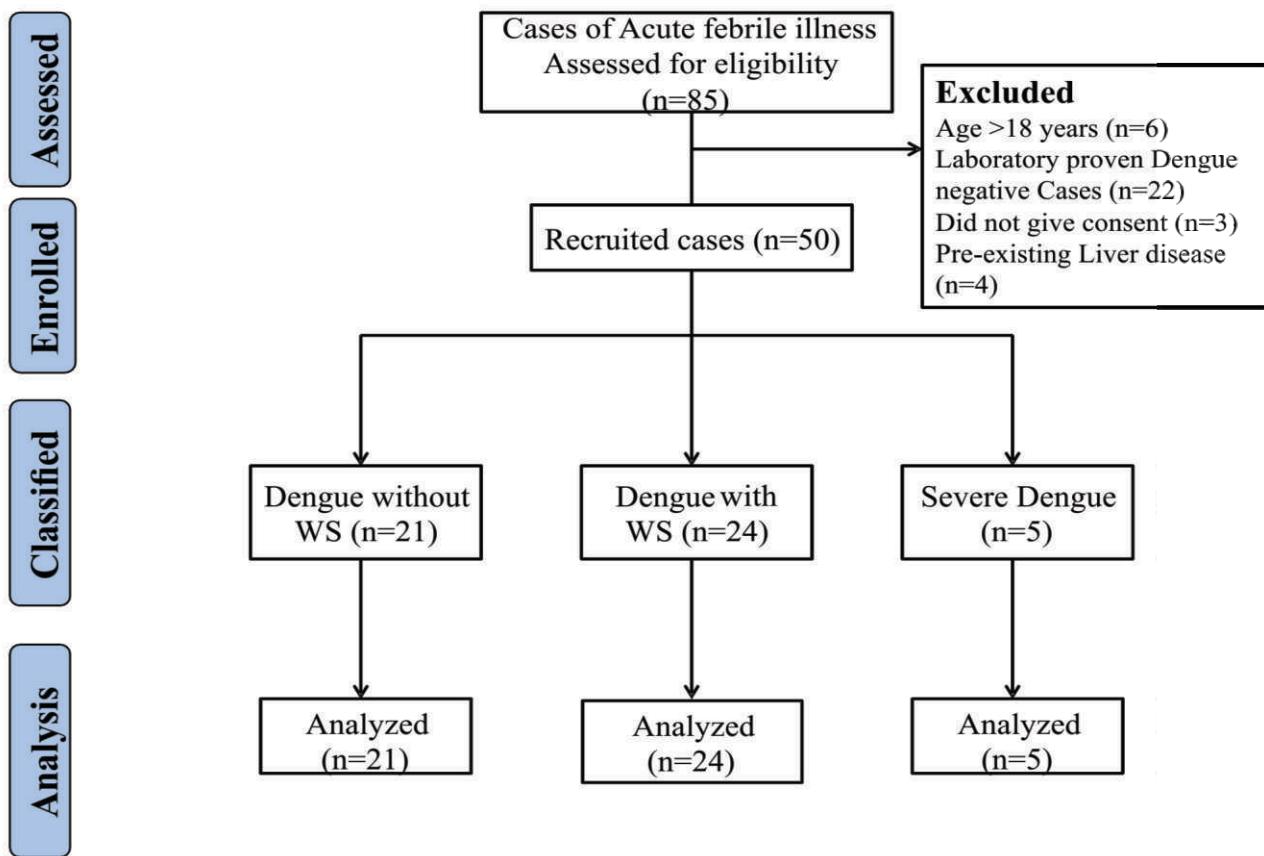
Figure 1: Flow chart of study participants included in this study.

dengue infection should be strongly kept in endemic zones. Elevated liver enzymes were present in non-severe dengue group as well, reflecting hepatic injury in all stages of the disease. A further study from this region with large sample size would be helpful in answering pattern of liver dysfunction with severity of illness, its relation with other common co-infections and its effect on disease outcome.

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Incidence of Dyslipidemia Among Nondiabetic Normontensive Indian Population

Rohit Chhari, Prashant Puruskar, CC Chaubal, Komal

Department of General Medicine, People's College of Medical Sciences and Research Centre, Bhopal - 462037

ABSTRACT

Dyslipidemia is now considered as an independent risk factor for cardiac disease worldwide. Lipid abnormalities are major risk factors for premature cardiovascular disease (CVD). There are emerging evidences of premature CVD occurring among Indians, at least 10 years earlier as compared to other ethnic groups. In this context, the present study was designed with aim to determine lipid levels and to compare the lipid levels and prevalence of dyslipidemia in a non-diabetes and non-hypertensive patients in Bhopal District. The participants were in the age group between 18-80 years. Overall prevalence of dyslipidemiawas 26.6% among study subjects 26 %, 25.3%, 18.1% and 51.3% of participants had high serum cholesterol, hightriglycerides, low high density lipoprotein (HDL), high low density lipoprotein (LDL) and high cholesterol/HDL ratiorespectively. The prevalence of dyslipidemia was high among study population (26.6%). Screening programs should be conducted for early detection of dyslipidemia. Information, education and communication programs based on lifestyle modification like healthy diet habits, regular physical activity for weight controland tobacco cessation need to be implemented.

KEY WORDS: dyslipidemia, high density lipoprotein, premature cardiovascular disease

INTRODUCTION:

During past 20 years, India has experienced remarkable socioeconomic development, with the mean income increasing by several folds. Consequently, the lifestyles of people throughout the country have changed dramatically. Several epidemiologic studies inthis context found that serum lipidconcentrations were higher in a significant part of the population and that an increasing proportion of the population had dyslipidemia. Dyslipidemia is now considered as an independent riskfactor for CVD worldwide[1-4]. Dyslipidemia is a term to lipoprotein abnormalities including elevated serum Triglycerides (TG), increased Total Cholesterol (TC), increased LDL-cholesterol (LDL), increased VLDL cholesterol, and a reduced level of HDL-cholesterol (HDL)[5-7]. Several studies have demonstrated that many middle-aged persons are at increased absolute risk for developing CVD in the near future (e.g. 10-year risk). Due to high relative risk for CVD, long term (lifetime) risk for CVD is increased even when 10-year risk is not considered to be high, e.g., in young adults. Individuals especially with dyslipidemia have significantly higher mean TG, LDL and TC. The mean levels of TG, TC and LDL increased with successive increase in BMI and waist circumference in both genders[8-10].

Cardiovascular events are the number one cause of morbidity and mortality worldwide.Although diabetes mellitus (DM) and hypertension (HTN) are two major contributors towards cardiovascular morbidity and mortality however, other risk factors should also be taken into account to reduce the number of casualties resulting from CVD. Dyslipidemia are often overlooked and under treated. Since this is independent risk factors for cardiovascular events, therefore health care professionals should consider dyslipidemia in order to improve assessment of cardiovascular risk and mortality. Framingham score must be used to stratify cardiovascular risk i.e. low, moderate and high score categories[11-12].

Traditionally, diabetic and hypertensive patients are screened for dyslipidemias. Most of the

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Corresponding Author:
Dr Prashant Puruskar
Professor,
Department of General Medicine,
People's College of Medical Sciences
and Research Centre, Bhopal - 462037
Phone No.: 9826017209
E-mail: prashantchoubey0810@gmail.com

time non-diabetic and normotensive patients do not get screened often as their disease is considered less life threatening. We determined the frequency of dyslipidemias in non-diabetic and normotensive subjects in this study. By early detection and management of this independent risk factor, we may be able to contribute for minimizing cardiovascular mortality and morbidity.

MATERIALS AND METHODS:

The study was conducted at Department of General Medicine, Peoples College of Medical Sciences & Research Centre, Bhanpur, Bhopal after obtaining clearance from Ethics Committee of Institute. This was a descriptive study.154 normotensive, nondiabetic subjects (aged 20-80 years) both male and female, were included in this study. Sampling technique was non-probability purposive sampling. Subjects were considered to have dyslipidemia if any of the four criteria was present: Total cholesterol (TC) > 200. Triglycerides (TG) > 150. Low density lipoproteins (LDL) > 130 High density lipoproteins (HDL) < 40 mg/dl. Subjects with systolic blood pressure (SBP) less than 140 mmHg and diastolic blood pressure (DBP) less than 90mmHg without medicinal use were taken as normotensive and with fasting blood sugar level < 126 mg/dl were defined as non-diabetic and included in the study. Subjects with systolic blood pressure (SBP) greater than 140 mmHg and diastolic blood pressure (DBP) greater than 90 mmHg with fasting blood sugar level > 126mg/dl, or known diabetic and known hypertensive were excluded from the study. All subjects fulfilling the inclusion criteria were selected for this study. An informed consent was taken from all the participants.

The demographic information such as name, age, gender was noted. Patients were interviewed and investigated for absence of hypertension, diabetes, renal, hepatic or cardiac disease. All patients in the study were specifically investigated for fasting cholesterol, triglycerides, low density lipoproteins and high-density lipoproteins. All this information was collected and noted in a proforma. The data was entered into SPSS version 20 and analyzed.

RESULTS:

A total of 154 patients were included in this study and among them Male and Female were 96 (62.3%) and 58 (37.7%) respectively. Age range of the population was 18-80 years. NAFLD positive cases were 15 (9.7%) only. The number and percentage of smoking, Tobacco and alcohol users were 65 (42.2%),

84 (54.5%) and 61 (39.6%) respectively.

Among all patients with dyslipidemia, 26% had total cholesterol, 25.3% had triglycerides, 18.1 % had LDL and 26 % had HDL. (Table 2, Figure 1-4). Table 3 showed distribution of dyslipidemia in selected population and had 26.6%.

Table1: Distribution of Study Population (n=154).

Variable		Frequency(n)	Percentage (%)
Gender	Female	58	37.7
	Male	96	62.3
NAFLD	Negative	139	90.3
	Positive	15	9.7
Smoking	Negative	89	57.8
	Positive	65	42.2
Tobacco	Negative	70	45.5
	Positive	84	54.5
Alcohol	Negative	93	60.4
	Positive	61	39.6
CAD	Negative	141	91.6
	Positive	13	8.4

Table 2: Distribution of lipid profile in study population (n=154).

Dyslipidemia	Frequency (n)	Percentage (%)
Total cholesterol (TC) > 200	40	26
Triglycerides (TG) > 150	39	25.3
Low density lipoproteins (LDL) > 130	28	18.1
High density lipoproteins (HDL) < 40 mg/dl	79	51.3

Table 3: Distribution of Dyslipidemia in Study Population.

Dyslipidemia	Frequency	Percent
No	1	0.6
Yes	41	26.6
Missing (Blank)	112	72.7

DISCUSSION:

Dyslipidemia is one of the major risk factors for CVD. Many researchers have been done in the field of standard risk factors like diabetes and hypertension. This study addressed the issue of dyslipidemia amongsubjects 18-80 years of age, whose are non-diabetic and normotensive patients and for whom dyslipidemia isthe most important modifiable risk factor. The prevalenceof dyslipidemia was 41% and found concordant withstudies in India. Previous studied showed prevalence of dyslipidemia
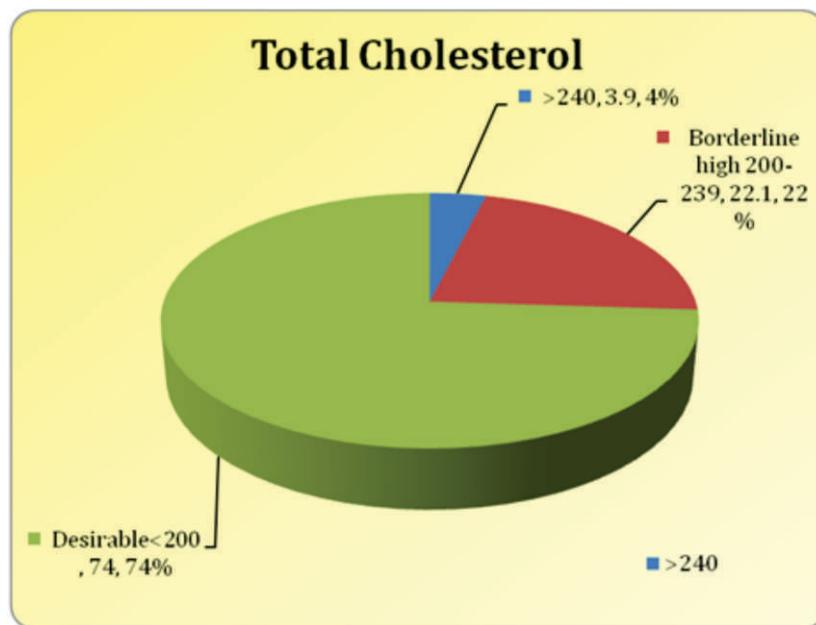
Figure 1 Showing that the 74% samples Desirable<200, Borderline high 200-239 is 22.1% and 4% samples is >240.mean and Sd of total cholesterol 163.60±45.52.
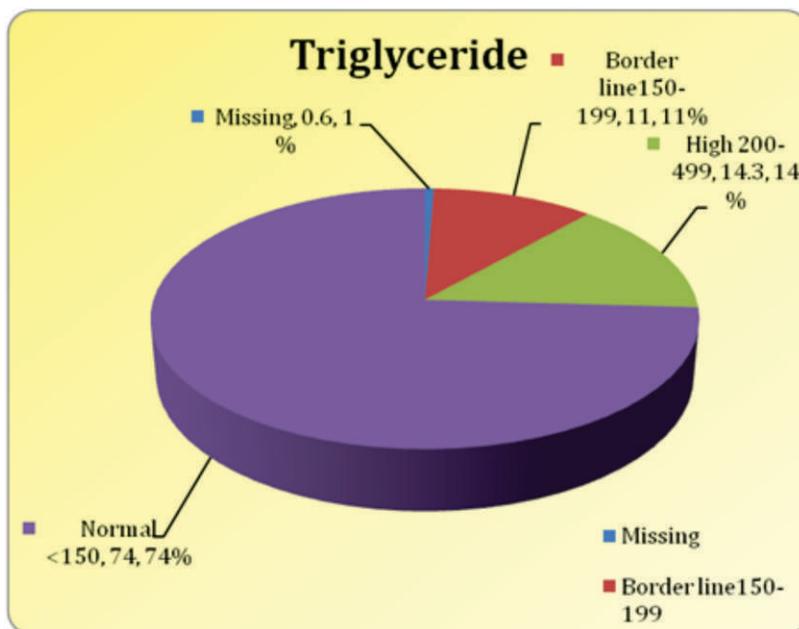

Figure 2: Showing that the 74% samples Normal<150, 14% samples is high200-499, 11% lies in Border line 150-199 and 1% is missing data.

in adultpopulation was found to be 56% to 75.9%[13-15].

The mean age of the samples in our study was 55.49±17.23 years as compared with study of Estari et al, where the mean age of the subjects was 42.2±10.3 years. So, we see that the age group selected in studies are quite higher and belongs to population at higher risk for cardiovascular events[1].

As dyslipidemia is major contributing factor in cardiovascular risk much research has been done worldwide in different geographical regions. A study was conducted by Mahalle et al had the total cholesterol of the subjects was 179±15.8 gm. /dl, which is more than our data, which is 163.60± 45.52 mg/dl and is comparable with the above study[16].

The mean triglycerides of the samples in our study was 120.76±66.82 mg/dl as compared with the study conducted by Wankhade et al, where mean serum triglycerides of the subjects were127.67±
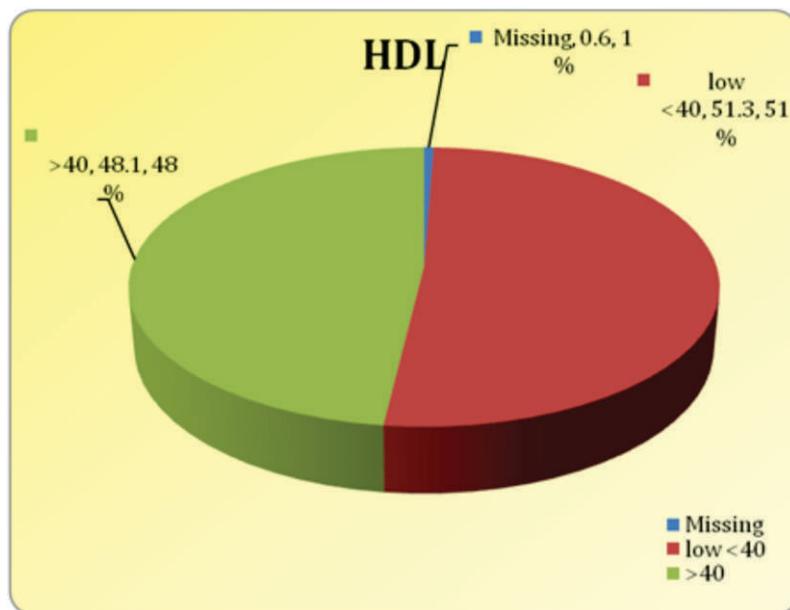
Figure 3: Showing that the HDL in >40 samples is 48%, low <40 is 51% and 1% is missing data Mean and Sd of HDL is 39.75±16.99.
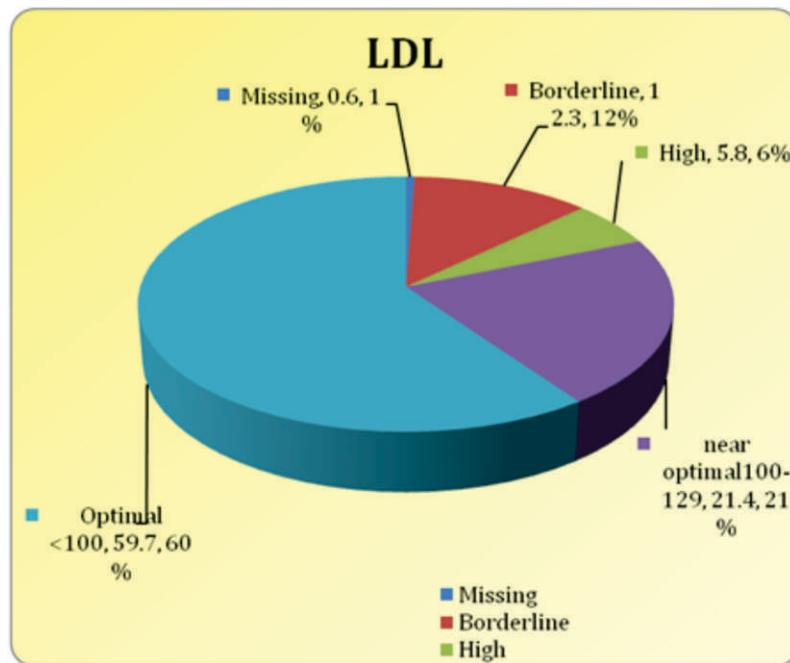

Figure 4: Showing that the LDL 60% samples has optimal<100, 21% samples has near optional 100-129,6% samples has lies in high, 12% samples lies in Borderline and 1% sample data is missing. Mean and Sd of LDL is 95.23±34.57.

58.37gm/dl, which is comparable toour study. In our study the mean LDL &HDLof the subjects were 95.23±34.57 and 39.75±17.10 mg/dl and compared to study conducted by Wankhade et al, reported 108.53±29.47gm/dl and 40.38±8.33 mg/dl respectively which was higher[17].

In our study the dyslipidemia was found in 26.6 %. When compared with studies conducted in different countries. The prevalence of dyslipidemia in this study was lower than Korean population (44%).Among the Chinese population it was 35.5%. 44.2% had isolated hypertriglyceridemia, 14.7% had hypercholesterolemia and 28.0% had isolated low high-density lipoproteincholesterol[18,19]. Overall, 66.5% of Thai population had some form of dyslipidemia. Prevalence of high LDL, low HDL, and

high triglycerides were 29.6%, 47.1%, and 38.6%,respectively. The prevalence of dyslipidemia and hypertriglyceridemia among Saudi population was about 40% and 44%respectively.Similarly Dyslipidemia was high in Jordan population (75%) and in all the geopolitical zones of Nigeria with the consistent pattern being low HDL and high LDL[14,20-22]. It is therefore concluded that our population is also higher risk for cardiovascular disease considering the percentage of dyslipidemia in our non-diabetesand normotensive population. As Our sample size is large to derive that the findings on the entire population. The consumption of unhealthy diet and lack of physical activity could be a major cause of high prevalence of dyslipidemia among this population. Furthermore, as nondiabetic, normotensive have low risk of dyslipidemia so it is suggested that regular awareness programs about benefits of healthy diet, regular physical activity and lifesty lemodification and its benefits for reducing the risk of cardiovascular diseases at work places in this population might be helpful to reduce the risk. Emphasis should begiven on screening programs for early detection of dyslipidemia should beconducted at work places. Those detected with dyslipidemia should be treated with lipid lowering drugs along with physical exercise and healthy diet which will help to prevent the development of cardiovascular diseases.

CONCLUSION:

It is concluded that high number of non-diabetes and non-hypertensive patients were found to have dyslipidemia across all age groups, it is suggested that an early intervention in the form life style modification for such patients. Since the burden on our health care system is increasing every day in a form of life style illnesses in form of diabetes and hypertension.

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Effect of Saliva on Orthodontic Arch wires using Scanning Electron Microscope: An In-Vitro Study

*Qazi Mohd Darain Ashraf, *Vivek Chaudhry, **Abhideep Singhai, *Nitesh Gaur, *Benet Babu, *Priyank Dubey

*Department of Orthodontics, Mansarovar Dental College, Bhopal, **Rishiraj College of Dental Sciences, Bhopal

ABSTRACT

To determine and compare the surface morphological changes in the stainless steel, and titanium-based alloys such as TMA, and CuNiTi in saliva solution. Each sample is made up of a 60 mm long wire engaged in 6 brackets welded on 0.18×0.006 inches molar band strip and tied with ligature wire, Six such samples (Two each)from three different types of three kind of wires i.e. TMA (Titanium-Molybdenum alloy or β Titanium), SS (Stainless Steel), and CuNiTi (Copper-Nikil-Titanium) were immersed in saliva solution The sample was divided into interbracket and intrabracket area. Each sample was divided into six parts each contains interbracket and intrabracket area. The corrosion of arch wires will be detected using SEM after a period of 12 weeks of incubation in artificial saliva. The inter bracket corrosion rate was significantly less as compared to the intra bracket corrosion for all materials in saliva. There was significant increase in corrosion rate in Stainless Steel as compared to TMA and CuNiTi wires. There was significantly less corrosion was found in CuNiTi wires. There was significant increase in corrosion in saliva. The highest corrosion was seen in stainless steel followed by TMA and minimum by CuNiTi wires.

KEY WORDS: corrosion, orthodontic wires, saliva

INTRODUCTION:

Over many years, in various phases in orthodontic treatment, stainless steel, cobalt chrome and titanium-based alloys like TMA and CuNiTi have been used for correction of various clinical conditions [1].

The orthodontic therapy involves wires and tooth bonded brackets that cause retention regions that are difficult for the patient mechanically to clean [2].

A phenomenon called corrosion results in changes in the surface characteristics of metals. Either the loss of metal ions straight into solution or progressive dissolution of a surface film, generally an oxide or a sulphide, results in corrosion [3].

The oral environment is an excellent climate for the corrosive assault of orthodontic equipment due to its microbiological and enzymatic phenomenon. Corrosive harm is caused to fixed orthodontic instruments which degrades physical characteristics and increases failure potential. In the light of the life span of devices the level of such harm is of specific concern. Corrosion on sliding mechanics on sleeves and arch wire is also of major importance and may impact the anchorage [3].

In orthodontic appliances, stainless steel, cobalt-chromium and titanium alloys are used to form a passive surface oxide film to withstand corrosion. It is prone to mechanical and chemical interruptions. This protective layer is unfailing. Although the metal surface is subjected to oxygen from air and surrounding substances, Oxide films often dissolve (passive) slowly only to reform (repassive).Acidic conditions and chloride ions can accelerate the passivation process. A diet rich in sodium chloride and acidic carbonated drinks therefore supplies corrosive agents on a frequent basis [3,4].

Studies have screened the effect of artificial saliva of various alloys, such as stainless steel [5], titanium [6], nickel titanium [7], as well as coated arch wires [8].

The orthodontic alloys are very susceptible to different types of corrosion and manufacturers have taken measures to fight this damaging process, it includes: 1) Alloy substitution or addition; 2) Coatings Modification of the production process.

Even after using all measures the harmful effect of corrosion is not completely eliminated. The

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Corresponding Author:
Dr Qazi Mohd Darain Ashraf
PG Student,
Department of Orthodontics,
Mansarovar Dental College, Bhopal
Phone No.: 8319421790
E-mail: q1darain@gmail.com

present study analysed and compare the corrosion of different alloys like stainless steel and titanium-based arch wires in artificial for a period of 12 weeks

MATERIALS AND METHODS:

The present study was conducted in the Department of Orthodontics and Dentofacial Orthopaedics, of Mansarovar Dental College and Hospital Bhopal, Madhya Pradesh. Then research got approval from Institutional Ethical Committee of college.The study was systematically scheduled to spread over a period of 3 months from June 2019 to August 2019. Single examiner performed all the examinations throughout the study. The sample size was derived in relation to the work done by Konda P et al[1]. The final sample size comes out to be 12 samples for each group.

The study is an Analytical experimental in-vitro study. The arch wires was kept for a period of 12 weeks in anArtificial Saliva Solution and increase in corrosion due to saliva solution was compared by using Scanning Electron microscope.

The three sample of archwires made up of stainless steel, CuNiTi rand TMA had been be taken each with the dimension of 0.017×0.025 inch.

Simulated fixed orthodontic appliances had been constructed with band material, brackets, arch wires and ligature wires. Molar band material had been be cut into strips of 60 mm each. Brackets had been welded on these band stripes equidistantly with two welds each, leaving 10 mm of space on both ends and 10 mm distance in between each bracket. Six such samples (two from each material) of were prepared.

Arch wires was engaged into the bracket slots and ligated with ligature wire. After ligation, the ligature had been cut to 10 mm length from the wings of the brackets and tucked below the arch wire in unidirection. During the tests the wires had been immersed in 2 ml of artificial saliva solutions.

Group I: Comprised of simulated appliances with stainless steel arch wires
Group II: Comprised of simulated appliances with TMA arch wires
Group III: Comprised of simulated appliances with CuNiTi arch wires.
All these samples had been be immersed in artificial saliva and incubated for a period of 12 weeks at 37°C in an incubator.
The Artificial saliva was taken from the **"ICPA'sWet Mouth"** with the principal composition — Glycerine30 %W/V + Sodium carboxymethyl cellulose 0.5 %W/V in a pleasantly flavoured base.

After the incubation, wire from samples of each group had been sectioned randomly into segments so that it included interbracket area and intrabracket area. This constitute a total 12 wire segments samples from each types of wires.

The samples were submitted to SEM Centre. The test was performed at CIPET Bhopal. Grid of $1mm^2$ was used for overlapping the SEM pictures to evaluate and compare the amount of corrosion between stainless steel, beta-titanium and nickel-titanium archwires. The grid was overlapped on the SEM pictures and the total area showing corrosion was measured for each sample at 300X magnification.

RESULTS:

The study compared the Interbracket corrosion and Intrabracket corrosion of stainless steel, TMA (β Titanium) and Cu-Ni-Ti (Copper-nikil-Titanium) wire in artificial saliva. The comparison of interbracket surface corrosion among different materials used in study when placed for 12 weeks in artificial saliva. The maximum corrosion was fond in the Stainless steel followed by TMA and minimum in the Cu-Ni-Ti wire in all the solutions and the result was statistically significant. (Table 1)

The comparison of intrabracket surface corrosion among different materials used in study when placed for 12 weeks in artificial saliva. The maximum corrosion was fond in the Stainless steel followed by TMA and minimum in the Cu-Ni-Ti wire in all the solutions and the result was statistically significant. (Table 2)

The test result also shows that there is significantly more corrosion occurs in the interbracket area in comparison to the intrabracket area (Table 3).

DISCUSSION:

The oral environment is an excellent climate for the corrosive assault of orthodontic equipment due to its microbiological and enzymatic phenomenon. For some time clinicians have been concerned with corrosion of orthodontic devices in the oral setting. They focuses on two main problems: whether corrosion products, if they are manufactured, are absorbed by the body and cause either localized or systemic impacts; and the impacts of corrosion on physical characteristics of orthodontic appliances and their clinical performance.

The study tries to determine and compare the surface morphological changes in the stainless steel, and titanium-based alloys such as TMA, and CuNiTi

Table 1: Interbracket corrosion (in mm^2) after 12 weeks of immersion in artificial saliva.

Types of Arch Wires	Mean	SD	f- value	p- value
Stainless Steel	902.35	8.25		
TMA	825.47	5.76	477.37	0.01(HS)
Cu-Ni-Ti	211.35	2.35		

Table 2: Intrabracket corrosion (in mm^2) after 12 weeks of immersion in artificial saliva.

Types of Arch Wires	Mean	SD	f- vlaue	p- value
Stainless Steel	1376.35	7.55		
TMA	1417.65	11.74	208.35	0.01 (HS)
Cu-Ni-Ti	555.39	8.25		

Table 3: Comparison of Interbracket and Intrabracket corrosion (in mm^2) after 12 weeks of immersion in artificial saliva.

Type of wires	Inter Bracket	Intra Bracket	t-value	p- vlaue
Stainless Steel	902.35	1376.35	89.07	0.01*
TMA	825.47	1417.65	189.47	0.01*
Cu-Ni-Ti	211.35	555.39	355.05	0.01*

obtained after a period of 12 weeks of incubation in artificial saliva with the help of scanning electron microscope (SEM).

The overall result of the present study showed that the stainless steel arch wire was corroded more than the beta-titanium and nickel-titanium. Between beta-titanium (TMA) and copper-nickel-titanium, beta-titanium was more corroded than that of copper-nickel-titanium.

Shin and Hwang[9] conducted a study in which they compared the corrosion behaviour of stainless steel and nickel-titanium and they found that stainless steel arch wires were more corrosion prone than the nickel-titanium arch wires. Similar to our study this result is consistent with most of the reports that stainless steel is more susceptible to corrosion than nickel-titanium.

In the present study the intrabracket span showed more corrosion than the interbracket span for all the arch wires which may lead to fracture of the arch wire, resulting in failure of the fixed orthodontic appliance. Movements of the arch wire in the brackets may cause fretting corrosion, which accelerates metal loss from both the arch wire and the brackets. The corrosion resistance of the bracket, bands, tubes and arch wiresrelies to some extent on the presence of uniform passivated layer of chromium oxide on the metal surface. Mechanical rupturing or damage of this passivating layer will reduce the corrosion resistance property[10].

Berradja et al evaluated the fretting wear patterns of orthodontic arch wires in dry and wet conditions and reported that stainless steel and nickel-titanium arch wires exhibited higher wear rates in the solutions than in air, indicating some synergism between the wear and corrosion processes. In the solutions the stainless steel arch wires had a much lower corrosion-wear resistance than the nickel arch wires[11].

Muller and Chen[12] compared the surface corrosion of stainless steel, nickel-titanium, beta-titanium and cobalt chromium, and found that beta-titanium exhibited good corrosion resistance, as did cobalt-chromium, whereas stainless steel and nickel-titanium wires showed pitting type of corrosive attack Kim and Johnson[13] conducted a study on corrosion of stainless steel, nickel titanium and beta-titanium orthodontic arch wires. The results showed that corrosion occurred readily in stainless steel and in some nickel-titanium wires and the breakdown potential for titanium wire could not be reached and wire remained passive throughout the entire range of 2,000 mV.

In order to improve the mechanical properties and corrosion resistance of titanium alloys and prevent the corrosion defects on the surfaces of the orthodontic appliances that influences friction, ion implanted nickel-titanium wires were introduced. With this technique, surface composition was permanently modified by inserting ionized atoms[14]. Copper is one of the third elements that has been added to nickel-titanium, resulting in a copper-nickel-titanium alloy with many potential clinical advantages in orthodontics. Manufacturing companies claim that the addition of copper would allow the orthodontist to more easily engage larger arch wires earlier in treatment to mal-aligned teeth. This is because the copper lowers the loading stress while still providing relatively high unloading stress resulting in more effective orthodontic tooth movement of teeth[10].

The corrosion on orthodontic reduced by Surface nitrification improves and rhodium coating. Trolic et al., (2019) found that pure artificial saliva, steel wires exhibit a larger tendency to general and

localized corrosion that NiTi wires, whose corrosion resistance is decreased by rhodium coating[15].

The same conclusion was obtained by Kamiński J. et al. who founded that showed an increase in corrosion resistance of stainless steel after conventional glow-discharge nitriding[16].

CONCLUSION:

The saliva present in the mouth causes surface corrosion of the orthodontic wires used for Orthodontic treatment andthe surface corrosion was more in the intrabracket span as compared to the wire in interbracket span. The surface corrosion was more in the stainless steel as compared to the TMA wires and Cu-Ni-Ti wires.

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Association of Serum Magnesium Level with Retinopathy in Type 2 Diabetes Mellitus

Lokendra Singh Rajpoot, Kavita Rati Dharwadkar, Srikant Chandrakar, Ashish Jain, Archana Sharma

Department of Biochemistry, People's College of Medical Sciences and Research Centre, Bhopal - 462037

ABSTRACT

Magnesium is an intracellular cation and coenzyme for various reactions of the glycolytic pathway. Hypomagnesemia has been shown to precipitate hyperglycemia and has, therefore, been implicated in insulin resistance and its microvascular complications. Poor glycemic control has been associated with retinopathy. Hence, we assessed association of serum magnesium with T2DM and diabetic retinopathy among 100 patients with type 2 Diabetic Mellitus (with complications) with their ophthalmological complications (retinopathy) admitted in People's College of Medical Sciences & Research Centre, Bhopal. Estimation of serum magnesium was done by spectrophotometric method using xylidyl blue. Comparison of serum magnesium level in patients with and without retinopathy in uncontrolled Diabetic patients. Serum magnesium level was 2.03 ± 0.33 among no retinopathy cases. Serum magnesium level was 1.86 ± 0.26 in NDPR (Non proliferative diabetic retinopathy). Serum magnesium level was. Serum magnesium level was 1.64 ± 0.25 in PDR (Proliferative diabetic retinopathy). So it is highly suggestive of hypomagnesia to occur at an increased risk diabetic retinopathy among patients with type 2 diabetes mellitus. Magnesium deficiency was associated with increased risk of diabetic retinopathy and poor glycemic control. Dietary supplementation may be advised to prevent such complications and improve glycemic control.

KEY WORDS: glycemic control, magnesium, retinopathy, type 2 diabetes mellitus

INTRODUCTION:

India has the largest number of diabetic patients in the world. It is increasing particularly in the most developing countries severely. Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycaemia. Depending upon the etiology of the DM, factors contributing to hyperglycaemia include reduced insulin secretion, decreased glucose utilization, and increased glucose production. The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems, leading to microvascular (retinopathy, nephropathy, neuropathy) and macrovascular (coronary heart disease, peripheral arterial disease, cerebrovascular disease)[1]. Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels[2].

Magnesium (Mg+2) is one of the important components of many foods such as grains, nuts and green leafy vegetables, and it plays a key role in many fundamental biological processes, including energy metabolism. (Mg+2) has received considerable attention for its potential role in improving insulin sensitivity and preventing diabetes and its cardiovascular complications[3].

It is claimed that (Mg+2) deficiency is common in diabetic patients and there is an inverse relationship between (Mg+2) intake and incidence of Type2 Diabetes mellitus T2DM. The magnesium is an essential cofactor of more than 300 enzymes including those important in glycolysis, neuromuscular transmission, synthesis of carbohydrates, proteins, lipid and nucleic acids, and it has a role in insulin's secretion, its binding and its activity. Experimental researches have shown that patients with diabetic retinopathy present low concentration of plasma magnesium, disposing to a higher risk of advanced

Corresponding Author:
Dr Lokendra Singh Rajpoot
PG 3rd Year Student,
Department of Biochemistry,
People's College of Medical Sciences and
Research Centre, Bhanpur, Bhopal-462037
Phone No.: 7000466522
E-mail: lokendrasinghrajpoot1111@gmail.com

retinopathy[4].

In patients with diabetic retinopathy, lower label of magnesium predicting a greater risk for diabetic retinopathy. Diabetic retinopathy is one of the leading causes of blindness in the world in the base of India.10 Using new surgical and medical techniques, the incidence of blindness can be reduced up to 95%. Decrease in visual acuity in diabetic retinopathy is either associated with maculopathy or proliferative complications of it. Hypomagnesemia has been reported to occur at an increased frequency among patients with type 2 diabetes compared with their counterparts without diabetes. Hypomagnesemia has been linked to poor glycemic control. Although, it is generally believed that stringent metabolic control delays the development of late complications in diabetes mellitus, it has not been demonstrated conclusively that such control holds back the development of diabetic retinopathy. Many studies have been undergone to find out the precipitated factors of retinopathy such as duration and type of diabetes, hyperglycemia, hypomagnesemia and increased urinary total protein levels. Hypomagnesemia has been demonstrated in patients with diabetic retinopathy, lower levels of magnesium predicting a greater risk for diabetic retinopathy.[5,6,7]

Diabetic retinopathy is one of the commonest causes of blindness in adults in the age group 30 to 65 years in developed countries. During the 1st two decades of disease, nearly all patients with T1DM and >60% with T2DM have retinopathy.[8] Twenty one percent of T2DM patients have presented with retinopathy at first visit. There are some classification as given below:

A. Nonproliferative Diabetic Retinopathy (NPDR): Mild type: Presence of 1 micro aneurysm with one or more of the following : a)Retinal haemorrhage; b)Hard and soft exudates. 2. Moderate type: a) Presence of Haemorrhage/ micro aneurysms or; b) Presence of both in at least one quadrant with one ormore of the following: Soft exudates; venous beading and intra retinalmicrovascular abnormalities. 3. Severe type: a) Haemorrhage or micro aneurysms or; b) Both in all quadrants; c) Venous beading in two or more quadrants; d) intra retinal microvascular abnormalities in at least one quadrant. B. Proliferative Diabetic Retinopathy (PDR): 1.Early: One or more of the following: a) NVE; b) NVD; c)Vitreous or preretinal haemorrhage; d) NVE< ½ disc area. 2.High risk: One or more of the following:

a) NVD > ¼ - 1/3 disc area; b)NVD with vitreous or preretinal haemorrhage; c) NVE > ½ disc area. Preretinal or vitreous haemorrhage. 3. Advanced PDR: a) High risk PDR, traction retinal detachment involving macula or b) Vitreous haemorrhage obscuring ability to grade NVD or NVE and IRMA – Intraretinal micro vascular abnormalities. NVE – Neovascularisation elsewhere. NVD – Neovascularisation over the disc. Clinical features of Retinopathy: Micro aneurysms; Retinal haemorrhage; Exudates; Cotton wool spots; Neovascularisation of retina and iris; Subhyaloidhae-morrhage and Vitreous haemorrhage and fibrosis. Macular edema can occur at any stage of diabetic retinopathy. Non proliferative diabetic retinopathy usually appears at end of first decade or early second decade in cases of type2 diabetes mellitus. Proliferative diabetic retinopathy usually appears within 5 years of non-proliferative diabetic retinopathy. Pregnancy, uncontrolled diabetes mellitus, uncontrolled HT can accelerate these changes. Other ocular complications: Cataract; Glaucoma; Retinaldetachment; Macularedema Investigations for retinopathy: Visualacuity; Fundusexamination; Fundus fluoresceinan-giography; Slit lampexamination. Treatment options for retinopathy:Laser photocoagulation; Injection ofsteroids. Anti-vascular endothelial growthfactor.

MATERIALS AND METHODS:

One hundred patients with type 2 DM with retinopathy admitted in People's College of Medical Sciences and Research Centre hospital between May 2019 to April 2020. Sample size was 100 diagnosed cases of type 2 DM which are further correlated for comparison of magnesium levels, with retinopathy. Method of collection of data: Patients with type 2 DM admitted to PCMS & RC underwent the following tests; FBS (fasting blood sugar); PPBS (post prandial; measured two hours after a standard meal); Fasting serum magnesium levels; Fundoscopy and Diabetics were divided into controlles (HbAIC <7), uncontrolled (HbA1C >7). Study variables included fasting serum Magnesium levels, HbA1c. Inclusion criteria: All cases of type 2 DM and age/sex matched on diabetic patients admitted to PCMS hospital in age between 20-70 years were included.

Exclusion criteria:
(a) Patient below 20 and above 70yrs; (b) Patient

with COPD; (c) Patient on diuretics and receiving magnesium supplements; (d) Patient with history of alcohol abuse; (e) Pregnant women; (f) Patient with anaemia (according to WHO guideline ≤11g/dl both in males and females) and Patient with history of epilepsy.

Sample collection: After overnight fasting for 8 – 12 hrs, approx. 3ml blood sample for serum magnesium red top plane tube, 2ml for HbA1c in EDTA vial. Samples was centrifuged at 3000rpm for 10 min. Serum was separated and used for analysis. *Estimation of serum magnesium*: By spectrophotometric method using xylidyl blue dye. Estimation of serum magnesium : By spectrophotometric method using xylidyl blue dye. PRINCIPLE: Colorimetric endpoint method. In alkaline solution, magnesium forms a purple complex with xylidyl blue, diazonium salt.

The magnesium concentration was measured photometrically via the decrease in the xylidyl blue absorbance. Kit contents: R1 - TRIS/6-aminocaproic acid buffer: 500 mmol/L, pH 11.25; EGTA: 129 umol/L; preservative; R2 - Xylidyl blue: 0.28 mmol/L; detergent; Preservative Diluent NaCl 9%, 50 mL; Specimen: Fresh unhemolysed serum was taken, as a hemolysed sample may falsely elevate magnesium levels; Glycohemoglobin Test: Boronate Affinity Chromatography.

The product name and generic name Glycohemoglobin Test Kit Package Insert Updated : 2nd , January, 2019. Materials Provided and main Components. XPRESS A1C Glycohemoglobin Test Strip is packed in a plastic vial. XPRESS A1C Glycohemo-globin Test Kit comes in the following package: Vial package (25 Tests/Vial, 1 Vial/Kit); 1Code Chip × 1 piece; HbA1c Test strip × 25 pieces; Sampler × 25 pieces; Buffer A × 1 bottle; Buffer B × 1 bottle. Data collection procedure: Data was collected after assaying blood sample of subjects. Statistical analysis: Student T test has been used to find the significance of mean pattern of serum magnesium between cases and controls by SPSS software. p-value ≤0.05 is considered as significant.

RESULTS:

The study was conducted in PCMS Bhopal on 100 DM type 2 with complication 30 DM type 2 without complication patients, taking into consideration all the inclusion & exclusion criteria for comparison of serum magnesium levels and complications of diabetes. The mean serum magnesium levels were 1.89± 0.18 mg/dl and 2.23 ± 0.28 mg/dl in cases (DM type 2 with complication) andcontrols (DM type 2 without complication) respectively. The mean serum magnesium levels in patients with NDPR and PDR were 1.86 ± 0.26 and 1.64 ± 0.25 respectively.

In our study serum Mg+2 was found to be significantly decreased in diabetic patients type 2 with retinopathy. Hypomagnesemia has been reported in patients with diabetic retinopathy. The present study revealed a definite association between diabetic retinopathy and low serum magnesium levels. Patients with diabetic retinopathy and those without it had a mean serum magnesium level of 1.86 mg/dl (NPDR), 1.64 (PDR) and 2.03 mg/dl (NO RETINOPATHY) respectively.

Table 1 : Comparison of serum Magnesium Level between Groups.

Serum Magnesium (Normal =1.8-2.5 mg/dl)	Mean ±SD	t-value	p-value
Cases	1.89 ± 0.18	5.38	0.001
Controls	2.23 ± 0.28		

Table 2 : Percentage of cases with diabetic retinopathy.

| Complications	Cases(n=100)	Controls(n=30)
Retinopathy	47(47%)	0 (0%)

DISCUSSION:

In our study serum Mg+2 was found to be significantly decreased in diabetic patients type 2 with retinopathy. Hypomagnesemia has been reported in patients with diabetic retinopathy. With lower serum magnesium levels predicting a greater risk of severe diabetic retinopathy[9].

The present study revealed a definite association between diabetic retinopathy and low serum magnesium levels. The observations are similar to our reports. So, probably hypomagnesemia

Graph 1 : Comparison of Serum Magnesium values.
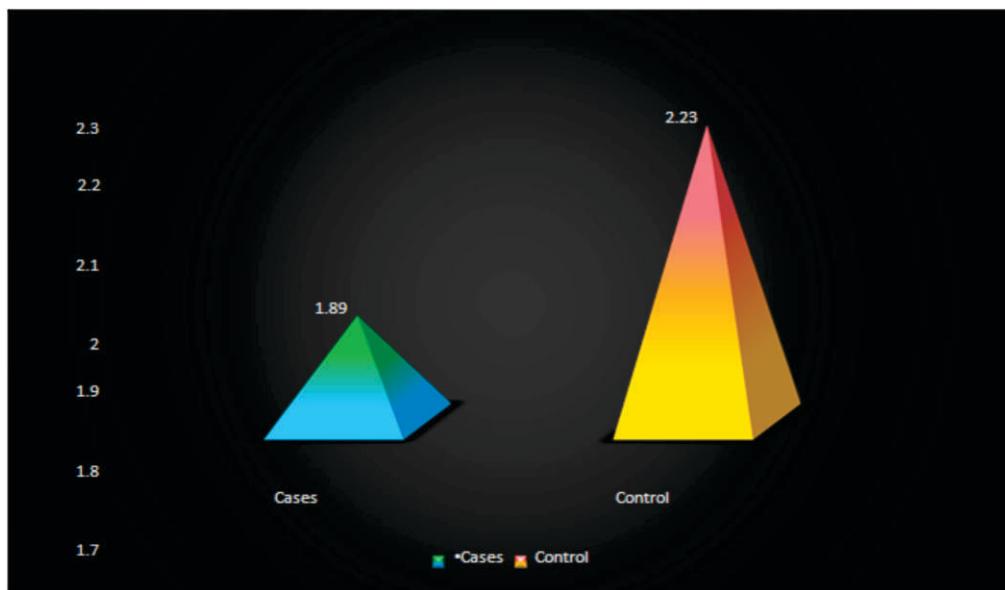
Graph 2: Percentage of patients with complication.
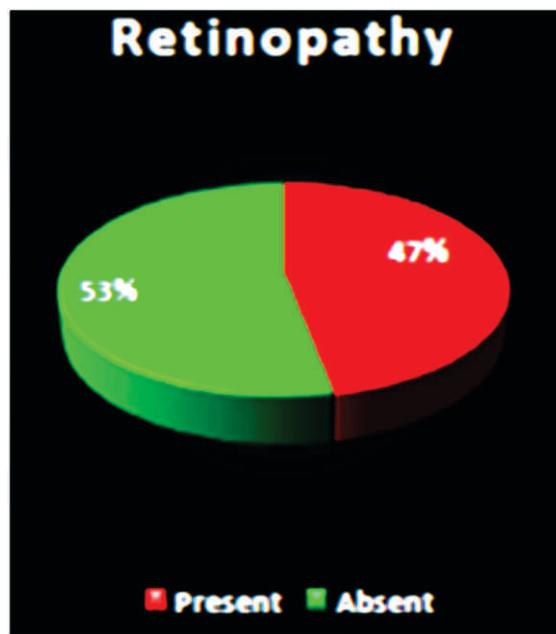
Table 3 : Comparison of serum Magnesium level in patients with and without retinopathy in uncontrolled Diabetic patients.

Type of retinopathy	Serum Magnesium	f-value	p-value
No Retinopathy (n=53)	2.03 ±0.33		
NPDR (n=29)	1.86 ± 0.26	9.72	0.01*
PDR (n=18)	1.64 ± 0.25		

NPDR- Non proliferative diabetic retinopathy PDR- Proliferative diabetic retinopathy.

Graph 3 : Comparison of serum Magnesium level in patients with and without retinopathy in uncontrolled Diabetic patients.
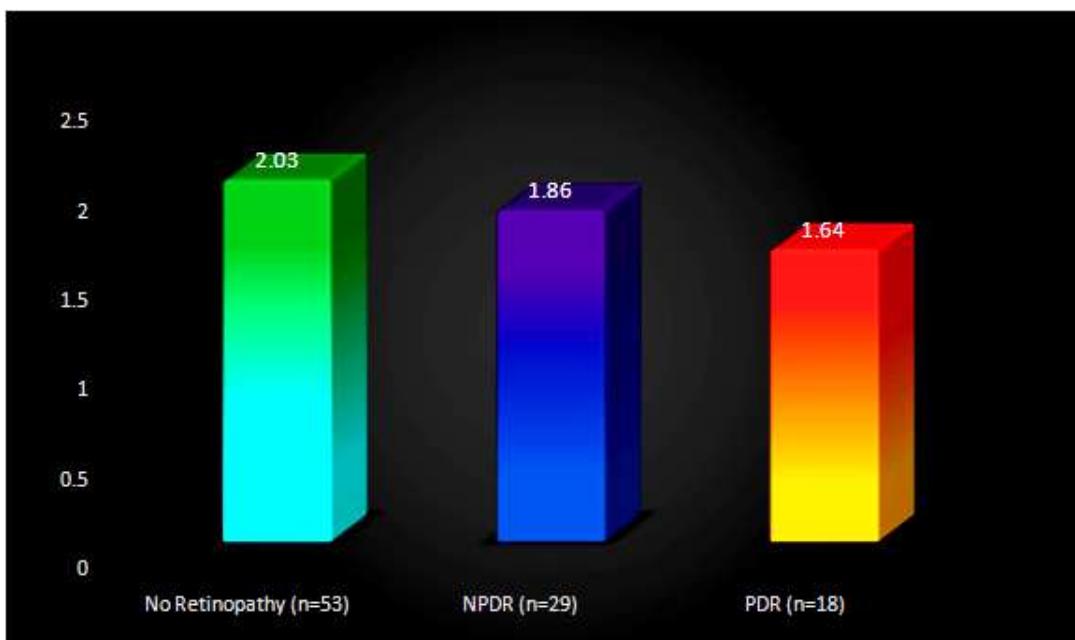
and increased serum cholesterol and triglyceride levels are responsible for microvascularchanges in diabetes leading to retinopathy.[10]

Hypomagnesemia has been reported in patients with diabetic retinopathy. With lower serum magnesium levels predicting a greater risk of severe diabetic retinopathy. The present study revealed a definite association between diabetic retinopathy and low serum magnesium levels. Patients with diabetic retinopathy and those without it had a mean serum magnesium level of 1.86 mg/dl (NPDR), 1.64 (PDR) and 2.03 mg/dl (NO RETINOPATHY) respectively. These observations are similar to other reports. Grfton et al. have proposed the inositol transport theory to explain this association[11,12].

CONCLUSION:

SerumMg+2 estimation is very important & plays significant role in prognostic evaluation of diabetes and prevent complications. Serum magnesium levels were significant low in DM type 2 with complication when compared to DM type 2 without complication. Levels of serum magnesium were low in uncontrolled type 2 diabetics than those in whom diabetes was controlled. Serum magnesium was found to be a factor associated with diabetic retinopathy. Serum magnesium is a factor in type 2 diabetes and associated with various complications. Hence it is worth measuring serum magnesium levels in patients with type DM and probably correlate their

relationship with various complications.

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Family Health Study and Presentation as a Comprehensive Teaching-Learning Method in Community Medicine for Medical Graduates

PV Prakasa Rao, Divya Swami, A K Dixit

Department of Community Medicine,   People's College of Medical Sciences and Research Centre, Bhopal - 462037

ABSTRACT

Against growing need of more interactive learning tools to impart comprehensive knowledge and discussion based training to medical students, present study aimed to test efficacy of family health study presentations when incorporated in academic curriculum. A carefully chosen set of cross-sectional questionnaire was designed to get perception of participating students on the effectiveness, nature, advantages and future recommendation for including family health presentations in academics. Feedback is taken directly from undergraduate medical students as they are the true gainers from this learning tool. The feedback of participating students against questionnaire was clubbed in four categories of results namely improving the understanding of community medicine as a subject, acknowledging it as a non-burden interactive learning method, utility in skills enhancement and future prospects. There were five response options kept in the study – strongly agree, agree, neutral, disagree and strongly disagree. Results of study as 75.5%, 65.92%, 72% and 80.7% responses were in favour of the positive aspects of family health presentation in the four categories of results. If neutral responses are also added to former positive responses – (19.26%, 9.62%, 20.7% and 12.5% respectively), overall non-negative response are 94.7%, 75.5%, 92.7% and 93.2% respectively. To conclude, results highlight that family health study presentations are meaningful activity and shows signs of being excellent learning methodology for medical coursework.

KEY WORDS: family health study, field visits, presentations, teaching-learning methods

INTRODUCTION:

The efficacy of traditional didactic lectures may not be very high as a method of teaching-learning. Didactic lectures often fail to transfer concepts and to enable deep understanding as effectively as active learning approaches. Innovative teaching-learning methods like studying a family and presenting the study to peers in the field can hold the attention span of the students for a longer time as there is higher level of participation for ensuring comprehensive learning and understanding. The authors believe that the method of family health study and presentations can contribute to achievement of the objectives of Competency Based Undergraduate Curriculum[1].

This belief is also supported by the work of Bala A et al. [1] establishing equivalence of community

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Corresponding Author:
Dr PV Prakasa Rao
Associate Professor,
Department of Community Medicine,
People's College of Medical Sciences and
Research Centre, Bhanpur, Bhopal-462037
Phone No.: 9111209981
E-mail: pvprakasarao@gmail.com

to ward and highlights that student's visit is meaningful if they are able to relate environmental, socio-economic and psychological factors with the family's health profile.Similarly, S.S. Kar et al.[2] conducted a study among 87 medical students at JIPMER, Puducherry. The student-centred learning (SCL) methodology was tested and most of the students had used PowerPoint presentation and videos for teaching. Students observed SCL as enjoyable, useful and informative technique.

Other relevant research works pertaining to family health study presentations include that of Mahajan PB[3] who shared his experience at community medicine department in PIMS as coordinator for reorientation of medical education (ROME) wherein students worked in a community based research project, collected data and prepared research reports, study suggested enhanced presentation and public speaking skills through competition amongst themselves. Jaques D[9] explained the choices available when teaching in groups like circular questioning, horseshoe groups, crossover groups, fishbowls and buzz group etc. Some choices require skilled and sensitive group handling

within the group, while others need task setting and organising purposeful activities. Miller GE[10] presented opinions for assessment of clinical skills/competence and performance, recommending need for graduates to develop the skill of acquiring information from various sources (human/ laboratory) and to analyse and interpret the data.

One of the problems faced by medical students is too much of information, too little time, too many students in crowded rooms, and examinations that discourage real learning as suggested by Rangachari (12).Thus it is quite fruitful to find and analyse various innovative learning tools available today, for imparting medical education to students in a way that ensures skills enhancement and retention of knowledge over longer time duration. Aim and objective of this study was to evaluate effectiveness of student seminars as a teaching-learning method in undergraduate medical programs in the Department of Community Medicine during the academic year 2018-19. A simple approach was used to obtain feedback from under-graduate students who have gone through this teaching-learning process and from the faculty of the department of Community Medicine who have implemented this. One of the core purposes of present study was to throw light at efficiency and effectiveness improvement via peer review when the findings of the study are shared with them through conference, seminars or presentations.

Objectives stated above are achieved better if a relevant topic of interactive discussion is provided to students. This is done through family health presentations as family is the fundamental institution of organization in society. Family visits give students exposure to understand association of various environmental factors, socio-economic factors and the psychological or emotional factors with holistic health status of the family.

During the family visits, students learn about family interactions and life cycle approach. However, it has been observed that due to some operational reasons, students do not benefit much from these family visits. The reasons mentioned by Bala A et al. (1) are that there is big gap of one year between family studies & final examination. Medical students do family study practical in 2nd prof and appear for exam in new final year. When they are allocated families, they lag communication skills, clinical experience, or understanding of social science techniques or nutritional assessment skills. Keeping the above mentioned reasons in mind, the designed a trainingschedule for UG students that teaches them all these before they are sent to the field for undertaking the family studies.

MATERIALS AND METHODS:

This is a cross-sectional questionnaire-based study was conducted at PCMS & RC, Bhopal with participation of 2016 batch MBBS students. A questionnaire containing 10 direct questions of both open-ended and close-ended types was designed to obtain feedback from the participating undergraduate students, faculty and the postgraduate students who have conducted the programme. The data was compiled in presentable form for analysis through Microsoft excel.

Each undergraduate student was allotted a family in the community being served by the Rural or Urban Health Training Centres. This was done after a batch of about 35 students is taught in the class over a period of two weeks about how to conduct a family study. The student is given a format to be followed during the study. Then, each student visits the allotted family a few times by going to the village/ hamlet in the college bus along with his/her classmates. After the study, the student makes a Power Point (PPT) presentation (about 20 to 25 slides), by utilizing the support available from peers at Computer Centre of the college. Thereafter, each student delivers a power point presentation of his/her community based family study, in the presence of faculty members and post-graduate students of the department of community medicine. Each student gets about 20 minutes time for the presentation and discussion. This is an interactive session during which cross questions are being asked. The faculty, under-graduate students and post-graduate students hold discussions (both during and at the end of the presentation).

Study of a family as a cohesive unit that deals with the physical, mental, social and environmental

health of all its members is undertaken in this study. Studying an individual holistically in the natural environment of his family provides a student better understanding of patient's disease in its totality.

Students of 2016 MBBS batch at PCMS & RC, who have gone through the family study and presentations method in the Department of Community Medicine were included in the study. Students of the batch that were transferred to other medical college hospitals for their compulsory rotatory internship; and those who didn't give consent for participating in the study were excluded. This research intends to obtain feedback from students and faculty involved in this innovative teaching-learning method implemented in full scale for the 2016-batch of MBBS students; and share the results of study with peers of community medicine.

Feedback approach was kept at finding out if use of family health study presentation is comprehensive and if it includes the three domains of learning (cognitive, affective and psychomotor) and whether there is any positive impact on communication, inter-personal and soft skills enhancement of students. The methodology of identifying relevant questions revolved around following 3 domains - 1. Responses from Cognitive Domain: Whether this activity improved his/her understanding of the subject of Community Medicine?; 2. Response from Affective Domain: Whether this teaching-learning activity increased their interest in the subject?; 3. Response from Psycho-motor Domain: Whether this activity enhanced the power point presentation making/ presentation skills? The idea of using above methodology was to assess whether subjected teaching methodology is a constructive, skill enhancing learning tool which prepares students for real life field interactions with common people and to analyse power of the tool in enhancing a student presentation skills and soft skills.

RESULTS:

There were five response options in the study – Strongly agree, agree, neutral, disagree and strongly disagree. Results obtained in Table 1 and Table 2 suggest 75.5% and 65.92% participants believe that subjected learning tool enhances understanding

of community medicine and is not a burden, rather it is an interactive and interesting activity (Table 1 and Table 2). Amongst the participants, 72% (*Minimum of the seven questions mentioned here) and 80.7% responses were in favour of the positive aspects of family health presentation in the four category of results. Adding the neutral responses to former positive responses - 19.26%, 19.26%, 9.62%, 20.7% and 12.5% the overall non-negative response reaches to 94.7%, 75.5%, 92.7% and 93.2% respectively. The results are in agreement of family study & presentation activity being a promoter of comprehensive learning. The responding students believe this tool will be helpful in enhancing their presentation, soft, problem solving and time management skills and they recommended this activity to be part of upcoming MBBS course works in the discipline of community medicine.

Thus results match the partial requirements set up by MCI curriculum[11] for UG courses that is focus on knowledge, skills enhancement, responsive-ness and communication. Other improvement areas are also indirectly included in the result areas namely the observation, demonstration, assistance, analysis, critique, team leading, professionalism, integration, interpretation and collaboration.

The designed questionnaire included all possible kinds of response types which is evident from the fact that Figure 1 is a positive indicator while figure 2 is a negative indicator. Further, figure 3 is a neutral group of questions and at last figure 4 again indicates a positive response.

The total number of respondents were 135 (n= 135). When asked about their suggestions for improvement of the method, 27 did not respond.108 participants provided their feedback. The suggestions given were requirement to improve transport facility, need for providing refreshments (snacks & drinks) during the field visits, reduction of time duration for which field visit in the village was arranged (3 hours) and the number of visits to the families be increased instead. Other suggestions are arrangement of equipment by RHTC/UHTC staff in the field (eg: BP apparatus, glucometer, etc.) and that the family visited must benefit from field visits through distribution of some medicines, pamphlets, etc.

DISCUSSION:

The respondents reported that the most common subjects during small group discussions withfamilies were nutrition and health, household environmental health, sanitation and hygiene, maternal and child health, family planning and

Table 1: Response to the question whether the T-L tool improved understanding of the subject.

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
This initiative has improved my understanding of community medicine	3	4	26	64	38
	2.22%	2.96%	19.26%	47.407%	28.15%

Table 2: Response to perception of family health presentation activity as a burden.

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
This activity is more of a burden rather than being a part of academics	39	50	13	17	16
	28.89%	37.04%	9.629%	12.59%	11.85%

Table 3: Response to the question if there is skill-enhancement through the discussed comprehensive and interactive learning tool.

Skills obtained by students through family study presentations	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	% Responses - Either Agree or Strongly Agree
Inculcating spirit of teamwork	3	4	10	74	44	87.4
Problem solving skill for helping families in distress	4	1	13	75	42	86.4
Presentation making skill	1	5	25	44	60	77
Public Speaking skill	4	3	17	63	48	82.2
Interpersonal communication skill	0	3	24	66	42	80
Communication and negotiation skills while interacting with classmates & faculty members	2	6	16	65	46	82.2
Time management skill	2	8	28	68	29	72

Table 4: Response to the question if students would recommend the T-L method to future MBBS batches

| Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
This practice needs to be continued for Upcoming batches of MBBS students.	4	5	17	44	65
%	2.96%	3.70%	12.59%	32.59%	48.15%
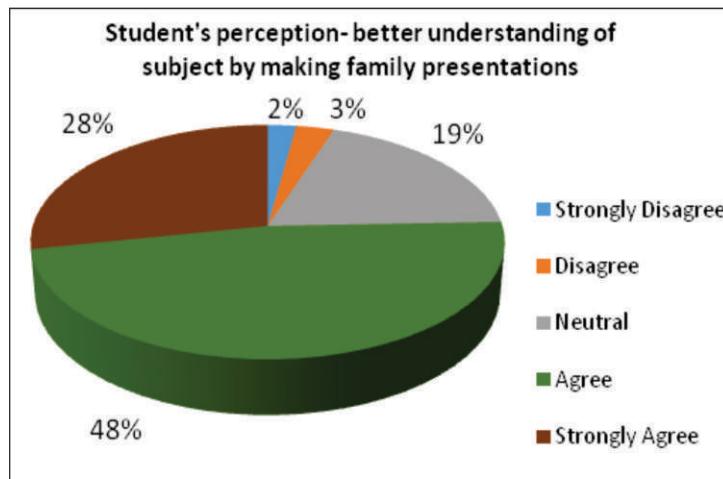
Figure 1: Response regarding improvement in understanding ofcommunity medicine subject.
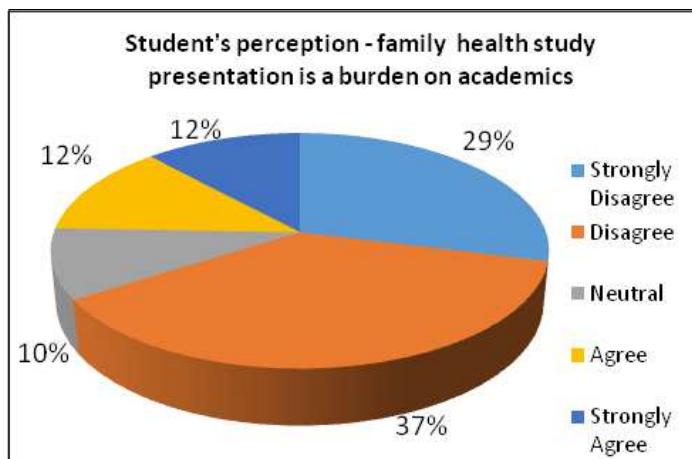

**Figure 2**: Response to perception of activity as a burden rather than meaningful part of academics.
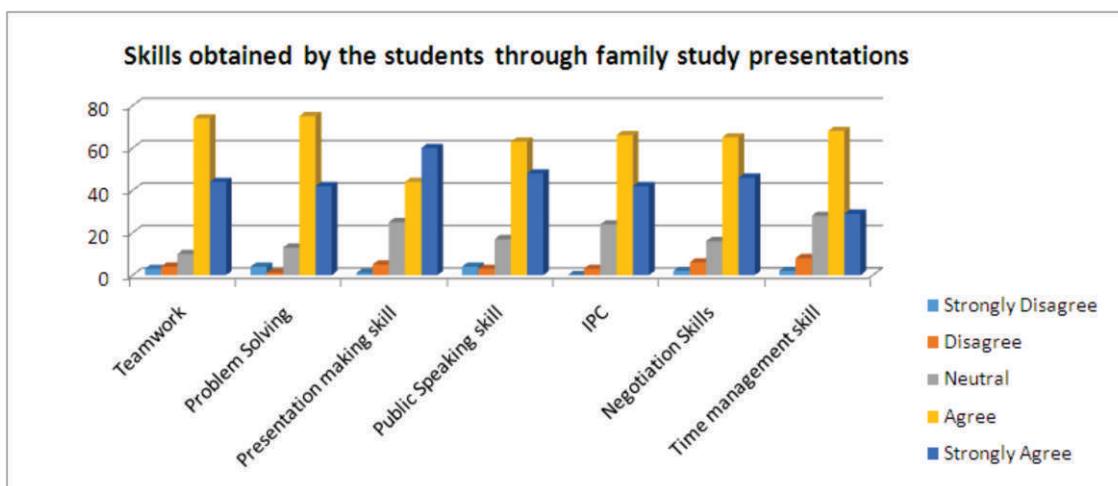
Figure 3: Response about Skills enhancement through this comprehensive and interactive teaching-learning tool.
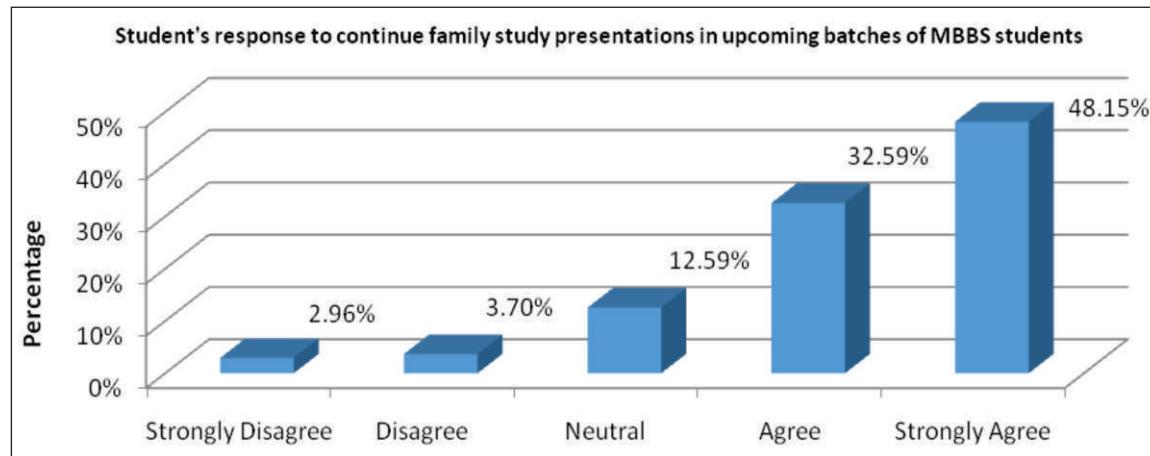
Figure 4: Response to recommendation for future usage.

maternal and child health, family planning and immunization. The authors contend that this teaching-learning (T-L) method contributes by several means to the teaching of community medicine. This is not only teaching, but also training. In this initiative, each UG student witnesses presentation by all the 37or 38 students of his group. They also contribute to the discussions and learn from the good practices and pitfalls of their group members. The PG students go through this exercise twice, for all the 150 students each year (once from urban area and once for rural area).This would happen for three consecutive years. Thus, it will prove to be a stupendous training. Also, the PG students guide the UG students and manage them during their preparation for the field work, during the visits to the community, during making of their reports and the preparation of power point presentations. This gives them tremendous opportunities to work as FGP (Friend, Guide and Philosopher) for UG students. They would get opportunities to apply the principles and methods of community medicine on a large number of families.

The new undergraduate curriculum is giving a lot of importance to building the right attitudes and ethics among the medical graduates and developing communication skills. It has developed a special module called 'Attitude, Ethics, and Communication (AETCOM)' which runs across different years of the MBBS course. Our T-L activity can contribute to achieving the objectives of AETCOM. Apart from being a good T-L activity, this gives some beneficial

side-effects for the institution in the following ways: This activity is bound to contribute to the society we serve. Students work as change agents for the community. This initiative thus improves the rapport of the department with the families in the community we serve. Also it creates the right impression and good will for the medical college in the community. Accounts get exposure to the real world when they visit the families in RHTC and UHTC areas of the medical college. The small group discussions in this teaching-learning method being studied were conducted after the students had visited the families during field visits. That is why 135 students could give a firm feedback that the method is comprehensive, involving the learning from all three domains. The feedback showed that their understanding of the community medicine subject improved (cognitive learning), their interest in the subject has increased (affective learning), and they obtained the much needed skills (psycho-motor learning). As this tool addressed the needs of all three domains of learning of community medicine students of MBBS, it is evident that this tool is comprehensive, interesting and more involving active learning tool.

Professional competence is an array of abilities across multiple domains or aspects of physician's performance in a certain context (Table 3). It is multi-dimensional, dynamic and changing over time, experience & setting as per Frank JR, Snell L et al(13). The authors believe that by fostering skills training and by increasing insight and commitment,

family study and presentation method enhances professional competence of the medical students.

CONCLUSION:

In contrast to traditional teaching through lectures, family presentation method seems to be more effective way of learning, which is relevant to self-development, is interactive and encompasses all the three domains of learning viacognitive, psychomotor and affective domains; thus making it a comprehensive learning method.

Family study and presentation activity ensures integrated learning participating students who went through the experience of field based family health study and presentations activity have overwhelmingly appreciated it as a worthwhile teaching learning method. They recommended it to be implemented during the coming academic years of MBBS.

Our study has analysed application of the programme on a single batch of students. It may be tried on more batches to know the affectivity and sustainability of this method on a continuous basis.

Field based Family studies conducted by UG students and presentations is an important teaching-learning method and hence needs to be incorporated on a regular basis in the medical curriculum.

The study obtained feed-back from the student participants about the teaching-learning method being evaluated, for its comprehensiveness. The feedback study statistically confirms that this teaching-learning method addresses all the three domains of learning; hence it is evident that the tool is comprehensive and the two components of communication, viz. inter-personal communication and public speaking skills of students are enhanced through proper implementation of this tool.

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Prevalence of Pseudomonas Aerugenosa in Clinical Isolates

Sumit Khatri, Sonia Bharty, Brahma Prakash, Kshitiz Chourasiya
School of Excellence and Pulmonary Medicine, Netaji Subhash Chandra Bose Medical College, Jabalpur-482003

ABSTRACT

P. aeruginosa is a leading cause of nosocomial infections ranking second among the gram-negative pathogens. Hence this study was conducted to enhances the knowledge of this particular organism. A total of 100 isolates of P. aeruginosa isolated from various clinical specimens like urine, pus, blood, body fluids, sputum, collected from patients, irrespective of age and sex, were identified by standard microbiological procedures. Total hundred culture positive samples were taken and found that P. aerugenosa was predominantly present in urine sample of male aged between 21-30 years.

KEY WORDS: P. aerugenosa- Pseudomonas aerugenosa, NNISS- National Nosocomial infection survilience system, ICU- Intensive care unit.

INTRODUCTION:

Pseudomonas aeruginosa is the epitome of an opportunistic pathogen of human. Infection due to P.aeruginosa is seldom encountered in healthy adults, now the organism has become increasingly recognized as the etiological agent in a variety of serious infections in hospitalized patients with impaired immune defenses. It causes infections particularly in burns patients where the skin host defenses are destroyed, orthopaedic infections, respiratory diseases, immune suppressed and catheterized patients. It may be the cause of the chronic debilitating pulmonary infections, which is one of the major cause of death in patients with cystic fibrosis.Generally, it contributes substantially to wound related morbidity and mortality worldwide[1]. P. aeruginosa is a leading cause of nosocomial infections, ranking second among the gram-negative pathogens reported to the National Nosocomial Infection Surveillance System (NNISS). Hence this study was conducted to

observe the growth of P. aerugenosa in various samples, according to parameters related to hospitalised patients, to enhance the knowledge about this particular organism.

MATERIALS AND METHODS:

This study was conducted in the Department of Microbiology, Pt. B.D. Sharma Post Graduate Institute of Medical Sciences, Rohtak over a period of one year.

A total of 100 isolates of P. aeruginosa isolated from various clinical specimens like urine, pus, blood, body fluids, sputum, etc collected from patients, irrespective of age and sex, were identified by standard microbiological procedures[2].

Collection of specimen: Urine: clean catch midstream urine samples were collected; Pus: aspirated samples of pus or swabs were collected; Blood: blood samples were collected by aseptic venipuncture' Body fluids: body fluids were aspirated under aseptic conditions and Sputum: expectorated sputum samples were collected.

Processing and culture of organism: Microscopy and culture of all the above mentioned samples were done. Cultures were performed on blood agar and MacConkey agar. Inoculated media was examined for growth after overnight incubation at 37^0C. Blood samples were cultured in glucose broth and subcultured on blood agar and MacConkey agar after incubation at 37^0C for 24 hours, 48 hours, 72 hours and on 7th day.The evaluation of colony morphology on the plating media was done and the subsequent

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Corresponding Author:
Dr Sumit Khatri
Senior Resident,
School of Excellence and Pulmonary
Medicine, Netaji Subhash Chandra Bose
Medical College, Jabalpur - 482003.
Phone No.:7697034954
E-mail: sk36636@gmail.com

identification procedures was carried on the isolated bacteria, using standard procedures[2,3].

Blood agar and MacConkey agar were inoculated within half an hour of collection with the specimen. Inoculation of samples on culture medium was done using an ordinary reusable inoculating loop.

IDENTIFICATION AND SCREENING OF P. AERUGINOSA:

Gram staining

The smear was prepared on clean, grease free slide, air dried and heat fixed. Crystal violet was poured on the slide, allowed to remain for one minute and rinsed with tap water. Gram's iodine was then poured on the slide, retained for one minute and then rinsed with tap water. The smear was decolorised with acetone and rinsed immediately with tap water. The slide was counter stained with carbol fuschin for 30 seconds and rinsed with tap water and air dried. The slide was finally examined under an oil immersion lens for presence of gram negative bacilli.

Detection of motility using hanging drop preparation:

A part of colony was passed into peptone water and incubated at 37oC for two hours. After two hours, hanging drop was prepared by taking a loopful of growth from peptone water. It was kept on a cover slip was inverted on a slide with a plasticine ring over it. First, the edge of the drop was focused under 10X of microscope and then it was examined under 40X. Gliding type of motility is seen in maximum number of isolates.

Biochemical Reactions:

The various biochemical reactions used were oxidase test, catalase test, motility, growth at 42°C,oxidative/fermentative medium (Glucose, Maltose, Lactose), nitrate reduction test, MR/VP ,mannitol motility medium, triple sugar iron agar, indole production, urea hydrolysis, citrate utilization.

RESULTS:

A total of 100 isolates of P. aeruginosa isolated from various clinical specimens like urine, pus, blood, body fluids, sputum, etc collected from patients, irrespective of age and gender, were included in the present study. P. aeruginosa isolates were identified on the basis of gram staining, motility and biochemical reactions. Out of 48218 clinical samples received in the laboratory during the study period, 12854 (26.66%) showed bacterial growth, while rest 35364 samples (73.34%) were either culture sterile, or showed the growth of bacterial contaminants or fungal isolates. The overall isolation rate of P. aeruginosa was 12.21%.

Gender wise distribution of patients with P. aeruginosa infection among different age groups. The male to female ratio among patients with P. aeruginosa was 1.27:1. Majority of the patients from which P. aeruginosa was isolated belonged to age group 21-30 years (40%), followed by age group 31-40 years (17.0%) and by age group 41-50 years (16.0%) (Table 1).

The distribution of P. aeruginosa isolates among a total of 100 clinical isolates. The maximum number of P. aeruginosa isolates were from urine samples (49%), followed by pus samples (20%), blood samples (19%), sputum (11%) and body fluids(1%) (Table 2).

DISCUSSION:

The purpose of this study was to enhance the knowledge about P. aeruginosa acoording to various patient related parameters.

Nosocomial infections caused by P. aeruginosa are frequently life threatening and often challenging to treat. In the current study, the rate of isolation of P. aeruginosa isolates from culture positive samples was 12.21% which was lower than studies by other authors who have reported an isolation rate of 19% to 31.71% from all culture positive samples[4,5,6]. This discordance may be due to implementation of better infection control measures in our hospital like barrier precautions, frequent hand washing by hospital staff, removal of catheters at frequent intervals, regular environmental sampling from ICUs, operation theatres and wards. However ,Sherertz et al have reported an isolation rate of 12.5% which was similar to current study[7]. Gales et al and Khan et al have reported an isolation rate of 9.46% and 6.67% respectively from culture positive samples which was low as compared to this study[1,8]. This may be due to different prevalence rates of P. aeruginosa isolates in different geographical areas. In addition, prevalence rate may also vary from hospital to hospital[8].

The present study showed maximum rate of isolation of P. aeruginosa isolates from urine samples (49.0%), followed by pus samples(20.0%), blood samples(19.0%), sputum(11.0%) and body

TABLE 1: Age and gender wise distribution of patients from which 100 isolates of *P. aeruginosa* were taken.

Age groups (years)	Male		Female		Total	
	n	%	n	%	n	%
0-10	2	3.57	5	11.36	7	7.0
11-20	9	16.07	5	11.36	14	14.0
21-30	17	30.36	23	52.27	40	40.0
31-40	11	19.64	6	13.64	17	17.0
41-50	12	21.43	4	9.09	16	16.0
51-60	3	5.36	1	2.27	4	4.0
>60	2	3.57	0	0.0	2	2.0
Total	56	56.0	44	44.0	100	100.0

TABLE 2: Distribution of *P. aeruginosa* isolates among various clinical samples.

Name of sample	Number of *P. aeruginosa* isolates(n)	Percentage (%) of *P. aeruginosa* isolates
Urine	49	49.0
Pus	20	20.0
Blood	19	19.0
Sputum	11	11.0
Body fluids	1	1.0
Total	100	100.0

fluids(1.0%). The results of current study were in accordance with Pitout et al who have also reported maximum rate of isolation of *P. aeruginosa* isolates from urine samples (43%), followed by pus samples (21%) and respiratory tract samples(20%) and blood samples(7%) [9]. However ,Khan et al reported maximum rate of isolation of *P. aeruginosa* isolates from pus samples(57.64%) followed by urine (24.2%) samples. The difference in rates of isolation may be due to difference in type of samples received in different laboratories[1].

The male to female ratio among the patients with *P. aeruginosa* infections in the present study was 1.27:1, which was in accordance with the study done by Sherertz et al who also reported the male to female ratio in patients with *P. aeruginosa* infection to be 1.3:1.[7] Khan et al reported the male to female ratio among patients with *P. aeruginosa* infection to be 1.6:1. Higher incidence of infection among males in the present study was in accordance with these studies.[1]

In the present study the majority of patients from which *P. aeruginosa* was isolated belonged to age group 21-30 years (40.0%), followed by age group 31-40 years (17.0%) and age group 41-50 years (16.0%).

Another study by Ruhil et al revealed the occurence of *P. aeruginosa* infection in patients aged16-40 years[10]. However, Mahmoud et al reported more *P. aeruginosa* infections in patients with age group more than 45 years and Sherertz et al reported majority of *P. aeruginosa* infections in patients in age group 50-80 years[6,7].

CONCLUSION:

This study concluded that *P.* aerugenosa was grown predominantly in urine samples especially in young adults hospitalised patients.

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Association of Body Mass Index and Pregnancy Outcome: A Hospital Record Based Study

Diksha Bisen, Rekha Sapkal

Department of Obstetrics and Gynecology, People's College of Medical Sciences and Research Centre, Bhopal

ABSTRACT

Association between pregnancy body mass index in normal cases and in cases with preterm birth was studied in a hospital record based cohort. 400 patients were studied for BMI in pregnancy, 200 cases of preterm labour in Group A and 200 without preterm labour in Group B. Data was analysed and correlated for preterm delivery and its relation to BMI. BMI was categorised as <18.5 (underweight); 18.5–24.9 (normal); 25.0–29.9(overweight); 30.0–34.9 (obese I); 35.0–39.9 (obese II); and ≥40.0 (obese III) .It was found that there is increased risk of preterm labour in patients with increase body mass index.

KEY WORDS: BMI, obesity, preterm delivery, preterm labour

INTRODUCTION:

Pregnancy is the most important event in a woman's reproductive life. There are multiple factors which influence its outcome, age at conception, smoking, co-morbidities, lifestyle, psychological health, and of course body weight. Preterm delivery (PTD), defined as birth at less than 37 weeks gestation, has long been a known consequence of maternal underweight[1]. Almost all the factors have a defined and definite response on the outcome of pregnancy. But amongst all body weight especially body mass index is the most confusing factor.

Cnattingius et al stated that both high and low BMI have adverse effect on pregnancy outcome. They also stated that preterm labour is a leading cause of infant mortality, morbidity, and long-term disability, and these risks increase with decreasing gestational age. Obesity increases the risk of preterm delivery[2].

Rahman MM et al, observed that maternal underweight was significantly associated with high risk of preterm birth[3]. Baeten et al found that obesity had a stronger association with early preterm birth (<32 weeks) than overall preterm birth[4]. Riley KL et al observed that increase risk of spontaneous preterm birth associated with increase pregnancy body mass index[5]. Multiple studies have come to contrasting conclusions regarding effect of Body mass index (BMI) on preterm labour. Obese nulliparas without chronic disease had higher risk for spontaneous delivery <28 weeks of gestation[6].

Maternal obesity is an independent risk factor for PTD in singleton pregnancies but not in multiple pregnancies. Obesity and nulliparity increase the risk of sPTD, whereas obesity and multiparity increase the risk ofe PTD[7]. Maternal BMI was associated with more spontaneous preterm deliveries and lower birth weight, and in contrast, higher maternal BMI was associated with a higher birth weight and macrosomia. It was concluded that both high and low maternal BMI have adverse effects on pregnancy outcome[8].

Gary M. Shaw, et al showed obesity categories I–III to be associated with increased risk of spontaneous preterm birth at20–23 and 24–27 weeks among those of parity 1 in each race/ethnic group. Underweight was associated with modest risks for preterm birth at ≥ 24 weeks among women in each racial/ethnic group regardless of parity[9].

MATERIALS AND METHODS:

This retrospective case control, comparative, record based observational study was done in peoples college of medical sciences Bhopal for a period of 1 year.

Selection of sample was done in defined period of conduct of study in the records available. 2 comparable groups were selected (group A – preterm

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Corresponding Author:
Dr Diksha Bisen
Post Graduate 3rd Year,
Department of Obstetrics and Gynecology,
People's College of Medical Sciences &
Research Centre, Bhopal - 462037
Phone No.: 8308778563
E-mail: diksha.bisen@gmail.com

labour, group B – term labour). In our study those women in preterm labour (Group A) were cases, while those women in term labour (Group B) were controls. Total 400 patients were listed and their BMIs were calculated. The inclusion criteria were singleton pregnancy; Age between 22-30 years; preterm pregnancy, Non smoker, non alcoholic, non diabetic, non hypertensive. The Patients with co-morbidities or disease (eg. deranged lipid profile, cardiac anomalies etc), Multiple pregnancies. Post-term pregnancy were excluded from study.

We divided the patients in 2 groups, 200 cases of preterm labour (patients delivered before 37 week of gestation) and 200 with normal term labour(patients delivered after 38 week of gestation). BMI was categorised as <18.5 (underweight); 18.5–24.9 (normal); >25 (overweight/Obese). Data was analysed and correlated for preterm labour and its relation to BMI.

RESULTS:

There were 46% of preterm birth (mean age 26.4 years) and 12% of term birth (mean age 22.7 years) seen in obese and overweight (>25), and 8% preterm and 0.5% term birth seen in underweight (<18.5). The patients with normal BMI (18.5-24.9) had 46% of preterm and 87.5% of term deliveries (Table 1 Figure 1).

Table 1: Distribution of term and pre-term deliveries according to BMI.

Category (BMI)	Preterm (Group A) (n=200)		Term (Group B) (n=200)		Total (n=400)
Underweight (<18.5)	16	8%	1	0.5%	17
normal (18.5 -24.9)	92	46%	175	87.5%	267
Obese and overweight (>25.0)	92	46%	24	12%	116

The Chi square value is 63.3916. p-value is <.00001. That is significant association was found. NOTE: With normal body mass index and overweight preterm delivery was 46% i.e . same (Table 2).

The Chi square value is 24.139. p-value is <.00001. That is significant association was found. NOTE: With normal body mass index and underweight preterm labour was 46% and 8% respectively.

Table 2: Association in normal BMI and overweights with preterm/term delivery.

	Category 1 (preterm)	Category 2 (term)	Total
Group 1(normal)	92	175	267
Group 2(overweight and obese)	92	24	116
	184	199	383

Table 3: Association in normal BMI and underweights with preterm/term delivery.

	Category 1 (preterm)	Category 2 (term)	Total
Group 1(underweight)	16	1	17
Group 2(normal)	92	175	267
	108	176	284

DISCUSSION:

We observed that both underweight and overweight or obese women are at high risk of preterm deliveries which is statistically highly significant.This is in line with the results got by Rahman MM et al who conducted a systematic review and meta-analysis of population based cohort and found that maternal underweight was significantly associated with higher risk of preterm birth[3]. Wang LF, Zhou H et al showed that pre pregnancy obesity was a risk factor for preterm birth[10]. Enomoto K, Aoki S et al who all found that excess gestational weight gain was associated with higher frequency of large for gestational age and macrosomia, poor weight gaincorrelated with higher frequency of SGA, Preterm Birth, Preterm Premature rupture of membranes and spontaneous preterm birth and optimal weight gain within recommended rang was associated with better outcome[11]. All these studies were carried out in Asian countries, like our study.

Some contrast studies like one by Riley KL[5] showed that obesity was not associated with increased risk of spontaneous preterm birth among multiparous women. Women with higher BMI had a decreased risk of spontaneous preterm birth, infect obesity is protective factor for preterm birth. However, but this study was conducted in American population. In view of conflicting studies it may be safe to say that effect of BMI on timing of labour may be population specific.
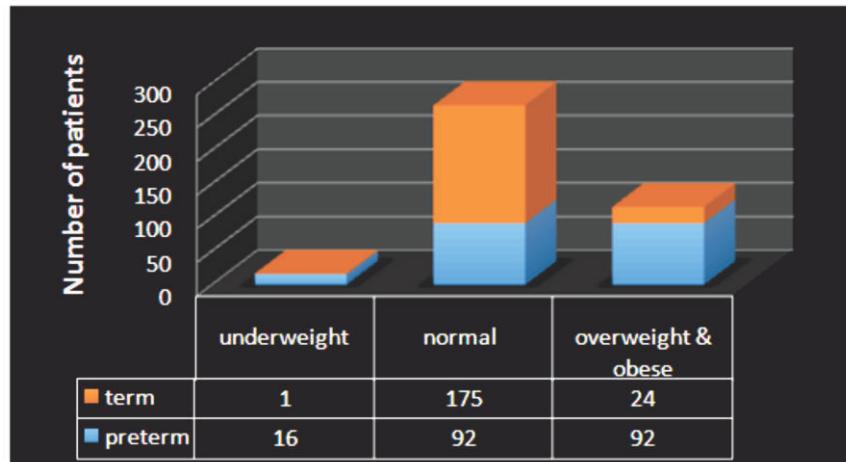
**Figure 1:** Distribution of term and pre-term deliveries according to BMI
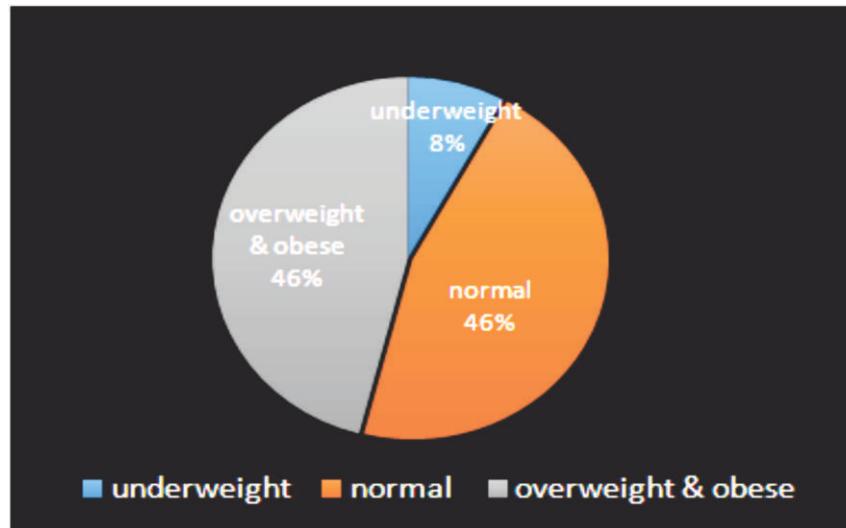
**Figure 2:** Percentage of Preterm Birth in Relation to BMI.
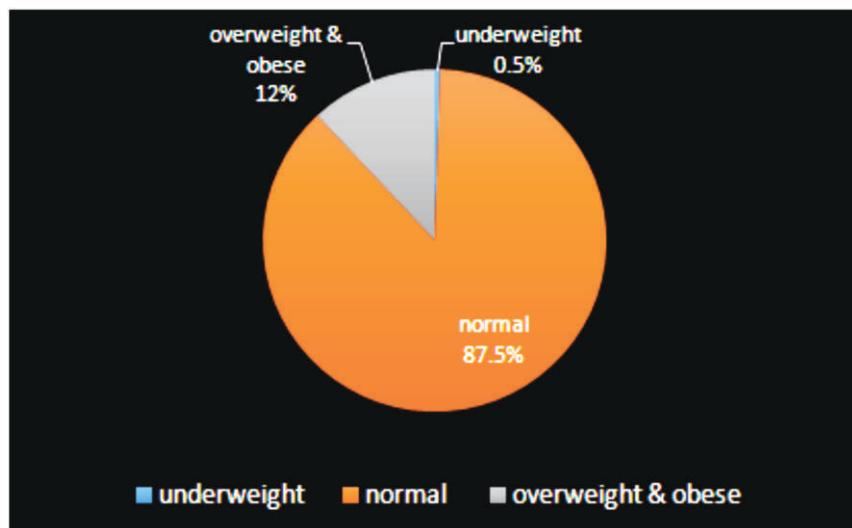
Figure 3: Percentage of Term Birth in Relation to BMI.

Body composition of different populations may have different effects on the pregnancy outcomes.

Both high and low maternal BMI have adverse effects on pregnancy outcome. Increase in maternal Body Mass Index was associated with increased preterm delivery outcome. Pre-conception counselling should include maternal BMI as an important risk factor for adverse pregnancy outcome. Controlling of pregnancy weight gain in overweight women may control and improve pregnancy outcome.

CONCLUSION:

Increase in BMI leads to increased pre term labour, as it can be seen in our study that those with overweight/ obese were having preterm labours as compared to those with normal BMI. While those women who were underweight had comparatively less frequency of preterm labour as compared to obese/overweight. Most of the women with normal labour had term delivery. Hence, maternal BMI is observed an important risk factor for unexpected preterm birth.

LIMITATIONS:

Small sample size of this study is its limitation. Larger studies with multi-centric randomized control trial may be conclusive. Confounding variables like anaemia abnormal lipids etc were not included in the study.

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Anxiety Associated With Endodontic Therapy: An Evaluative Study

*Shantwana Singh, **Brijesh Kumar Singh, ***Bharat Choudhary, ****Remya Ramachandran, *****Vaibhav Bansal, ******Deepa Davis

*Department of Conservative Dentistry and Endodontics, Rishiraj Dental College, Bhopal, **Department of Surgery and Radiology, Private Veterinary Practice, ***Department of Conservative Dentistry and Endodontics Guru Govind Singh College of Dental Sciences, Bhopal, ****Private Practice, *****Department of Public Health Dentistry, Sri Aurovindo College of Dentistry, ******Private Practice

ABSTRACT

Patients treated for endodontic reasons might experience anxiety due to the pain associated with this procedure. This anxiety can be managed by psychotherapy or pharmacological intervention or combination of the two. This study was carried out to assess the level of anxiety associated with pain precipitated during the endodontic treatment. It also assessed the various ways by which this anxiety could be brought down. Amongst the patients who underwent endodontic treatment, in the Department of Conservative Dentistry and Endodontics, 100 were selected on the basis of having experienced pain during the endodontic treatment. After completion of the treatment, these patient were given a questionnaire to fill. It contained 12 questions to assess the level of anxiety, they could experience in future, during any endodontic procedure and the ways in which it could be brought down or controlled. Subjects who were given the positive information regarding endodontic treatment indicated that they were less fearful of pain associated with endodontic treatment.

As a result, the patient may be more at ease before and during treatment, avoidance behaviour may be decreased and the patients can make a decision regarding treatment choice which is based on common sense rather than fearful expectations..

KEY WORDS: dental anxiety, endodontic therapy, phobia

INTRODUCTION:

Endodontic treatment, at times, tends to precipitate pain, during and after treatment. Patients who have experienced this pain might develop a fear psychosis and could be reluctant to undergo any such treatment at a later date[1].

This anxiety or phobia related to endodontic treatment has been explained and is said to be characterized by an unpleasant state of inner turmoil. It is manifested as nervous behaviour, such as shuffling and pacing[2].Anxiety related to endodontic treatment is usually precipitated as a result of previous unpleasant stressful situations during or after the previous dental treatment[1]. Expectations of a future threatening situation coupled with negative experience from the past dental treatment could be the trigger factor. This may result in avoidance of future dental treatment and is one of the frequently encountered problems in dental practice[3,4,5]. Management of such patients is essential. Since otherwise they could prove to be a potential source of stress to the dentist and assistant. Numerous strategies have been suggested for management of these patients. Among these psychological, pharmacological and a combination of the two have been suggested and deployed.

This study was carried out so as to analyse the potential of anxiety precipitation during future endodontic treatment, amongst the patients who had experienced pain during and after endodontic treatment. It also analysed the different commonly used strategies for overcoming thisanxiety.

MATERIALS AND METHODS:

This study was conducted on the patients who underwent endodontic treatment, the Department of Conservative Dentistry and Endodontics, RKDF Dental College & Research Centre, Bhopal.

Corresponding Author:
Dr Shantwana Singh
Sr Lecturer,
Department of Conservative Dentistry
and Endodontic,
Rishiraj Dental College, Bhopal - 462037
Phone No.: 9340930725
E-mail: dr.shantwana87@gmai.com

S. No.	Questionnaire
Q 1	If you had to go to dentist tomorrow how would you feel before consultation?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 2	If you were to wait in dentist's office for your turn in chair for treatment, how would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 3	When you will be seated in dental chair for treatment,how would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 4	Based on experiences during your previous endodontic treatment, how would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 5	If you are in dental chair for root canal treatment, waiting for dentist, getting instruments & syringe for your treatment, would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 6	If you are about to be administered local anaesthetic injection in your gum, would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 7	When cavity will be prepared with airotor handpiece, how would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 8	When endodontic file will be introduced in to your tooth, how would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 9	When dentist immediately start your treatment without any rapport, would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 10	If dentist's waiting area is made more friendly with home environment &music is played, would you feel
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 11	Before starting the treatment, if you are shown video showing the treatment procedure & explained in detail, would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious
Q 12	If medication is administered for relieving anxiety, would you feel?
	(a) Not anxious (b) Slightly anxious (c) Fairly anxious (d)Very anxious (e)Extremely anxious

One hundred patients, comprising of both genders in the age group of 17 to 68 years, were selected on the basis of having experienced pain during or after the treatment.

All the patients were explained about the study and their consent was taken. Each patient was given a questionnaire consisting of 12 questions. They were explained in detail about the questions and the response to be marked. There are shows questioned: The questionnaire assessed the level of anxiety, they could experience in future, during any endodontic procedure and the ways in which it could be brought under control. Based on the response given by these patients, data was tabulated and assessed.

Descriptive and inferential statistical analyses were carried out in the present study. Level of significance was fixed at $p=0.05$ and any value less than or equal to 0.05 was considered to be statistically significant. Student t tests (two tailed, unpaired) was used to find the significance of study parameters on continuous scale between two groups. Analysis of variance (ANOVA) was used to find the significance of study parameters between the groups (Inter group analysis).

The Statistical software IBM SPSS statistics 20.0 (IBM Corporation, Armonk, NY, USA) was used for the analyses of the data Microsoft word and Excel were also used.

RESULTS:

In response to imminent consultation with the dentist, 60% of the respondents did not experience anxiety, 33% felt slightly anxious, 3% fairly anxious and 4% very anxious. In response to waiting in the dental clinic, 62% felt no anxiety, 33% felt slightly anxious, 4% fair anxious and 3% were very anxious. On being seated in the dental chair for treatment, 52% felt free of anxiety, whereas 32% were slightly

Table 1: Demographic characteristics of the study participants (N=100).

Variables	Sub-groups	100	%
Gender	Male	57	57.0
	Female	43	43.0
Age group (in years)	17 – 34	60	60.0
	35 – 52	32	32.0
	53 – 68	8	8.0

anxious, 6% fairly anxious and 10% were very anxious. On being administered local anaesthetic injection, only 17% felt free of anxiety, 47% were slightly anxious, 14% fairly anxious, 20% very anxious and 2% extremely anxious. On cavity being prepared in the tooth, 25% felt free of anxiety, 39% were slightly anxious, 11% were fairly anxious, 20% very anxious and 5% were extremely anxious. On endodontic file being placed in the tooth, 26% were free of anxiety, 40% slightly anxious, 8% fairly anxious, 21% very anxious and 5% extremely anxious. On unknown dentist starting the treatment, without any rapport, led only 16% to be free of anxiety, whereas 64% were slightly anxious, 7% fairly anxious, 10% very anxious and 3% extremely anxious. Making waiting area being made friendlier with music playing lead 89% towards relaxation, while 9% felt a little uneasy and 2% anxious. On being shown the video of the treatment and procedure being explained in detail lead 70% to feel relaxed, whereas 17% felt uneasy 3% anxious, 4% very anxious and 6% extremely anxious. With medication being administered for relief of anxiety 59% felt relaxed, 36% slightly uneasy, 1% anxious and 4% very anxious (Table 02). Amongst the questioned patients, females reported higher level of anxiety in response to the all questions, which was statistically significant (Table 3). Patients in the age group of 17-34 years, experienced higher level of anxiety than the older age groups, which was found to be statistically significant. Patients in the age group of 53-68 years experienced least amount of anxiety and 35-52 years experienced intermediate level of anxiety (Table 4).

DISCUSSION:

In our study, the number of male (57%) patients was slightly higher than female (43%) but overall and statistically, the level of anxiety in female patients was higher. Bartley et al and Stabholz A et al in separate studies have reported similar findings[6,7].

The higher level of anxiety in females can be explained on the basis of hormonal fluctuations that arise at various stages in life most commonly associated with the reproductive cycle and associated events[8]. These have been found to be linked with variable level of anxiety and due to different brain chemistry[8].

Patients were divided into three age groups, on the basis of psychological and physiological maturity. In the first age group, patients from 17-34 years were placed and they comprised 60% of the total patients evaluated. Mature patients were placed in the second age group, comprising of 35-52 years and they comprised of 32% of the total patients. More mature and elderly patients were grouped together, comprising of the third group, which ranged from 53-68 years. The level of anxiety was found to be higher in the younger patients. As the age progressed, the level of anxiety went down, with elderly patients experiencing the least anxiety. Similar result was found in a study carried out by Stabholz A et al, wherein it was found that younger patients, comprising of 35 -49 years, experienced higher level of anxiety than the other age group[7].

Amongst the various assumed situations, highest number of patients experienced anxiety, if the treatment was to be carried out by an unfamiliar dentist without any rapport, which is understandable, since any unfamiliar situation precipitates doubt or anxiety in the human mind. [9,10]The second highest number of patients, to experience anxiety, was in relation to administration of local anaesthesia injection into the gums. This appears to be justified since fear of injection, is one of the primary and prime reasons of fear in humans, when undergoing medical treatment. [10,11,12]Third highest number of patients, who experienced anxiety, was in relation to use of air rotor hand piece for cavity preparations. The sound of the air rotor hand piece, running in the oral cavity is quite disconcerting to quite a few patients, moreover if a person has experienced sensitivity or pain due to cavity preparation with air rotor hand piece, itcould lead to apprehension of the same, at any later use. [13,14]Fourth highest number of patients, experiencing anxiety was in relation to use of endodontic file within the tooth. Use of endodontic files in canals with vital pulp tissue can precipitate unbearable pain, which could lead to patients being apprehensive of their usage in future. [13, 14, 15]Fifth highest was when patient was seated in the dental chair waiting for treatment. Sixth highest number of patients to experience anxiety

Table 2: Comparison of the responses to the questionnaire in terms of {Mean (SD)} among males and females using unpaired t test.

Questionnaire	GENDER	N	Mean	Std. Deviation	t value	p value
Q1	Male	57	1.42	0.706	1.380	0.171
	Female	43	1.63	0.787		
Q2	Male	57	1.46	0.657	0.381	0.704
	Female	43	1.51	0.798		
Q3	Male	57	1.61	0.881	1.521	0.132
	Female	43	1.91	1.042		
Q4	Male	57	1.65	0.641	0.606	0.546
	Female	43	1.74	0.928		
Q5	Male	57	1.75	0.689	0.919	0.360
	Female	43	1.91	0.971		
Q6	Male	57	2.37	1.046	0.669	0.505
	Female	43	2.51	1.077		
Q7	Male	57	2.51	1.182	0.942	0.349
	Female	43	2.28	1.241		
Q8	Male	57	2.39	1.221	0.038	0.970
	Female	43	2.40	1.237		
Q9	Male	57	2.16	0.862	0.518	0.605
	Female	43	2.26	1.026		
Q10	Male	57	1.07	0.258	1.770	0.080
	Female	43	1.21	0.514		
Q11	Male	57	1.51	0.984	0.827	0.410
	Female	43	1.70	1.301		
Q12	Male	57	1.49	0.630	0.140	0.889
	Female	43	1.51	0.827		

was when going to dental office for consultation. While being seated, waiting for the consultation or treatment, thinking of the possible outcome, could lead to anxiety[14]. The least number of patients to experience anxiety was when waiting in the dental office for their turn[1].

Based upon previous endodontic treatment, majority of the patients, experienced anxiety, which ranged from extreme to slight. Amongst the anxious patients, slight anxiety was predominant. When seated in the dental chair for any dental treatment, majority of the patients, did not experience any anxiety, but when they were to wait for endodontic treatment, majority of the patients, experienced anxiety. A similar finding was obtained by Armfield et al in anstudy on management of fear and anxiety in the dental office.[3,16,17]

Amongst the various strategies for relief of anxiety, in relation to endodontic treatment, it was found that the highest number of patients, felt relaxed, free of anxiety, when the waiting area is made more friendly with homely environment and when music is played. Music tends to relieve anxiety and relax the person by soothing the nervous system,[18] since home environment is most relaxing, for majority of people, being present in a similar environment for treatment, can bring down the level of anxiety[14,18].

If patient are explained about the procedure in detail, as well as shown a video of that procedure, the relaxations is second highest after the waiting area changes. Administration of medication for relief from anxiety, results in lowest number of patients, feeling free of anxiety. Playing of music in the dental clinic was found to relieve dental anxiety quite effectively by Maulina et al.[18] The same fact was reiterated in separate studies by Ovayolu N et al[19] Mamedova L et

Table 3: Comparison of the responses to the questionnaire in terms of {Mean (SD)} among different age groups using ANOVA test.

Questionnaire	Age Around (in years)	N	Mean	Std. Deviation	f value	p value
Q1	17-34	60	1.55	0.769		
	35-52	32	1.50	0.762	0.571	0.567
	53-68	8	1.25	0.463		
	Total	100	1.51	0.745		
Q2	17-34	60	1.55	0.790		
	35-52	32	1.41	0.615	0.863	0.425
	53-68	8	1.25	0.463		
	Total	100	1.48	0.717		
Q3	17-34	60	1.72	0.885		
	35-52	32	1.78	1.008	0.047	0.954
	53-68	8	1.75	1.389		
	Total	100	1.74	0.960		
Q4	17-34	60	1.70	0.830		
	35-52	32	1.75	0.718	0.759	0.471
	53-68	8	1.38	0.518		
	Total	100	1.69	0.775		
Q5	17-34	60	1.88	0.940		
	35-52	32	1.81	0.592	1.364	0.260
	53-68	8	1.38	0.518		
	Total	100	1.82	0.821		
Q6	17-34	60	2.43	1.031		
	35-52	32	2.59	1.073	2.086	0.130
	53-68	8	1.75	1.035		
	Total	100	2.43	1.057		
Q7	17-34	60	2.42	1.211		
	35-52	32	2.56	1.216	1.466	0.236
	53-68	8	1.75	1.035		
	Total	100	2.41	1.207		
Q8	17-34	60	2.55	1.241		
	35-52	32	2.25	1.164	1.853	0.162
	53-68	8	1.75	1.165		
	Total	100	2.39	1.222		
Q9	17-34	60	2.22	0.940		
	35-52	32	2.16	0.954	0.055	0.946
	53-68	8	2.25	0.886		
	Total	100	2.20	0.932		
Q10	17-34	60	1.12	0.372		
	35-52	32	1.19	0.471	0.811	0.448
	53-68	8	1.00	0.000		
	Total	100	1.13	0.393		
Q11	17-34	60	1.53	1.065		
	35-52	32	1.84	1.322	2.017	0.139
	53-68	8	1.00	0.000		
	Total	100	1.59	1.129		
Q12	17-34	60	1.50	0.748		
	35-52	32	1.53	0.718	0.149	0.862
	53-68	8	1.38	0.518		
	Total	100	1.50	0.718		

Figure 1: Comparison of the responses to the questionnaire in terms of {Mean (SD)} among males and females using unpaired t test.
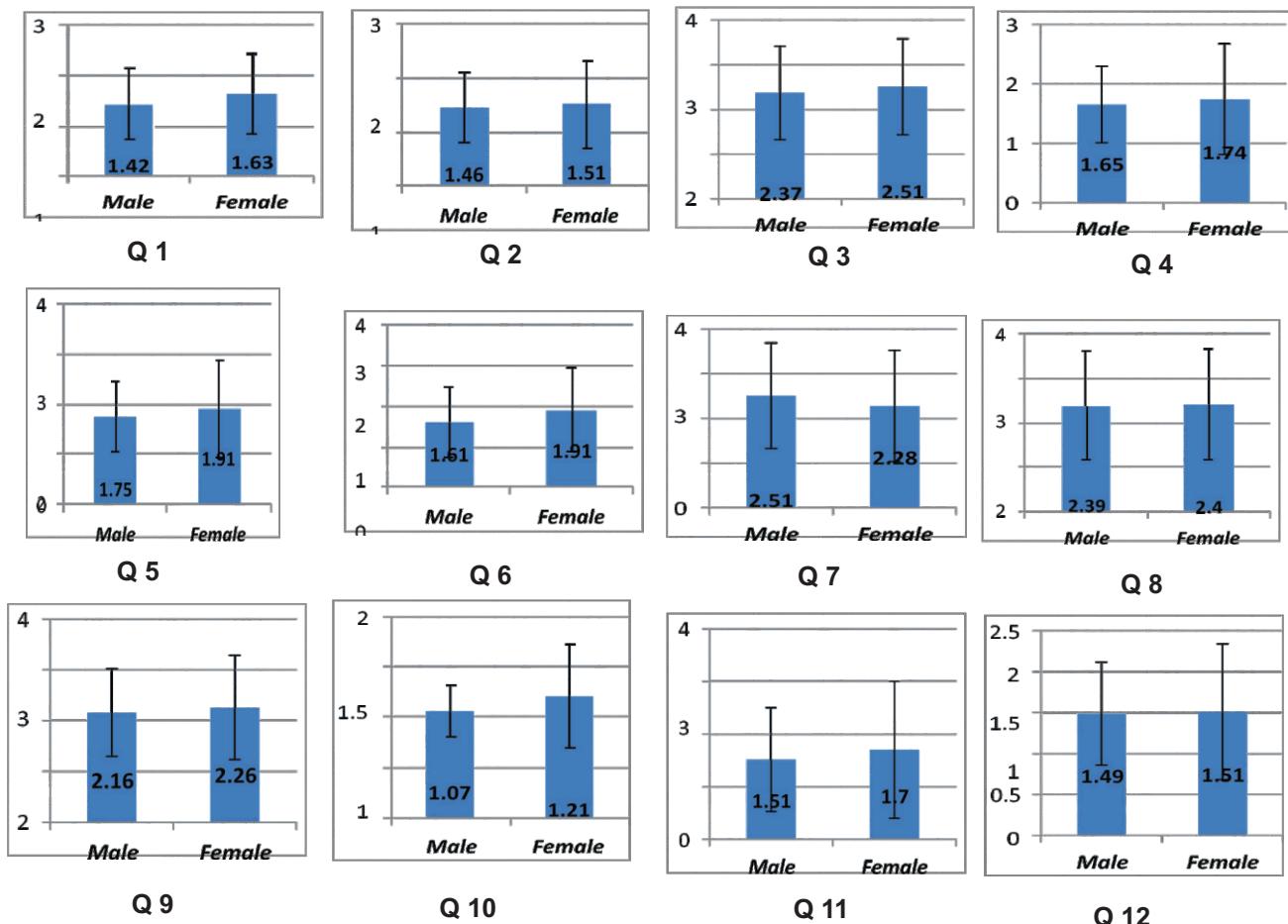
al [20], Klassen J.A. et al [21] and Rana S.A. et al [22]. Music helps to activate sympathetic and parasympathetic nerve system,[23,24]which decreases muscle contractility as well as heart rate which helps in reducing anxiety level[25].

CONCLUSION:

Dispelling negative beliefs and knowledge about endodontic treatment through information education and communication reduces fear of pain associated with endodontic treatment. As a result, the patient may be more at ease before and during treatment, avoidance behaviour may be decreased and the patients can make a decision regarding treatment choice which is based on common sense rather than fearful expectations.

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Figure 2: Comparison of the responses to the questionnaire in terms of {Mean (SD)} among different age groups using ANOVA test.

Q 1

Q 2

Q 3

Q 4

Q 5

Q 6

Q 7

Q 8

Q 9

Q 10

Q 11

Q 12
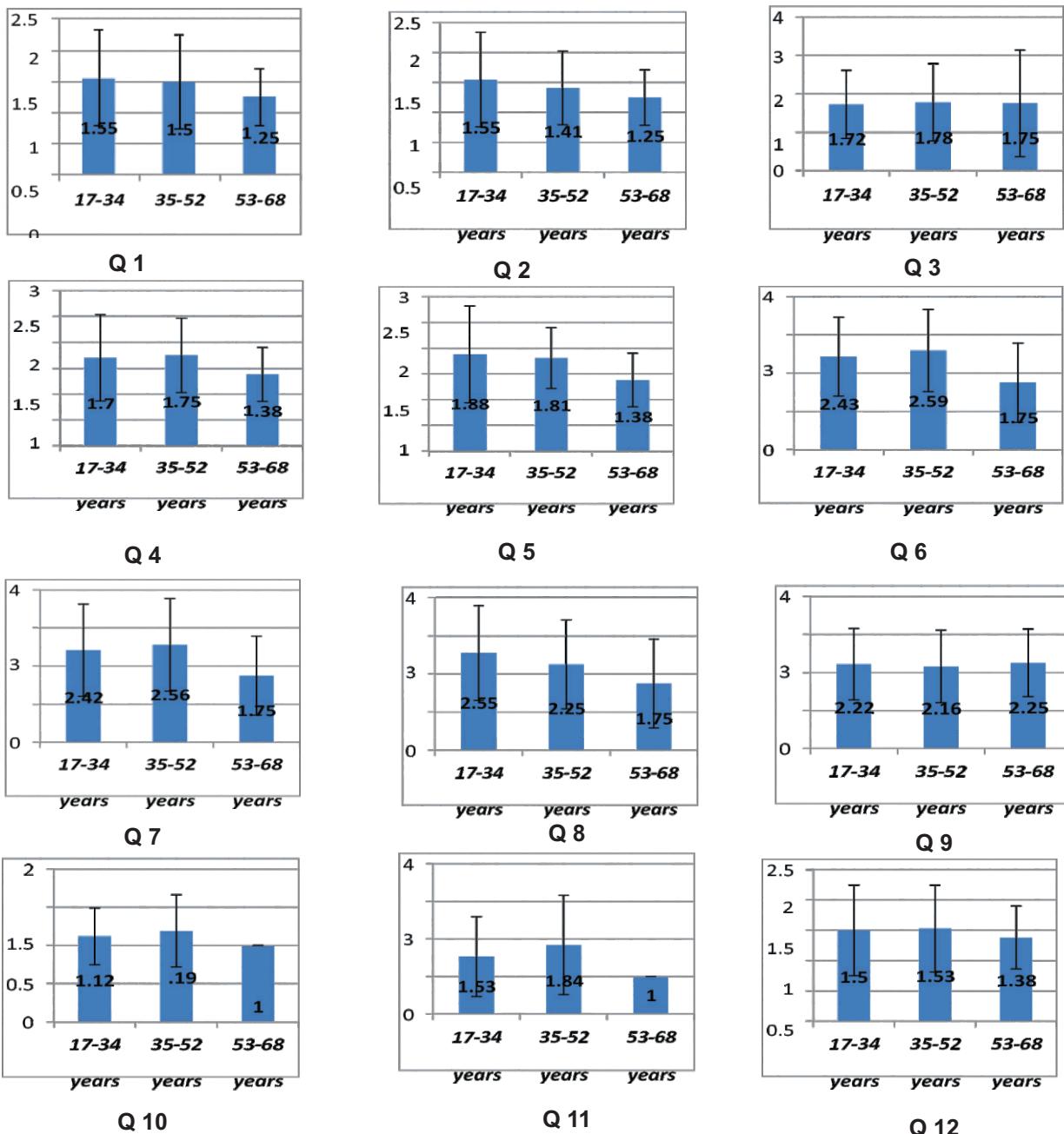
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Role of MRI in Assessment of Pituitary Lesions: A Case Series of Pituitary Masses

Fozia Raza, GS Rai, Abhinesh Saraf

Department of Radiodiagnosis, People's College of Medical Sciences and Research Centre, Bhopal - 462037

ABSTRACT

Pituitary masses are relatively common among general population with incidence varying from 10-12 percent. Most of these lesions are small, even microscopic; consequently, most patients are asymptomatic. Unnecessary surgery should be avoided by improving understanding of disease and its natural history. To diagnose intracranial pathology, we have conducted an observational case series of patients referred to the Department of Radiodiagnosis PCMS and RC for MRI brain. Patients with pituitary masses were identified with pituitary enlargement nearby or approaching the sellar region on MR imaging.

The first patient presented with craniopharyngioma of adamantinomatous type. The second patient was diagnosed with pituitary macro adenoma, while third patient was diagnosed after observing small nodule in anterior lobe of pituitary in left half suggestive of micro adenoma. The fourth patient likely had cystic / necrotic transformation of previous macro adenoma with haemorrhage. The fifth patient's MRI Brain reveals empty sella.

Dynamic contrast enhanced imaging played a crucial role in accurate localization of hormone secreting microadenomas and other pituitary lesions. MRI precisely assessed the invasion of cavernous sinus by macroadenomas on contrast enhanced imaging. MRI is undoubtedly an indispensible tool to evaluate hypothalamic-pituitary related endocrine disease.

MRI not only provides diagnosis, but also helps to plan surgical strategies due to its ability to provide multiplanar details of anatomical relationship of the gland to surrounding structures. It is also a method of choice for follow-up imaging in order to determine the response to conservative therapy as well as to identify remnant lesions/recurrence in postoperative situations. A comprehensive hormonal, radiological and even occasionally ophthalmological examination should be done for patients suspicious of developing pituitary masses. This is best done by a specialized multidisciplinary approach with a preference for the treatment of underlying conditions and constant monitoring for surgery.

KEY WORDS: craniopharyngioma, dynamic MRI, empty sella, microadenoma, pituitary macroadenoma

INTRODUCTION:

The sella is one of the most complex anatomical region in the brain. It encompasses the bony sella turcica and pituitary gland plus all the normal structures that surround it. Virtually any of these can give rise to pathology that ranges from incidental and innocuous to serious, potentially life-threatening disease. Sellar or suprasellar regions are most common site for pituitary tumors. The prevalence of clinically apparent pituitary lesions is estimated to comprise approximately 10% to 12% of all intracranial lesions with an annual incidence of 0.2 to 2.8 cases per 100,000 persons[1,2], while incidental pituitary tumors are detected in approximately 11% of individuals at autopsy. It is noted that craniopharyngiomas are responsible for 1 to 4 percent of all primary intracranial neoplasms and appear at a frequency of 1.3 per million years per human[3]. Most pituitary tumors are considered to be benign adenomas, although around 0.5 percent of pituitary tumors have been reported as pituitary carcinoma[4].

In past decades, pituitary gland imaging has acquired significant attention and progressed rapidly. Indirect methods of detecting pituitary gland dysfunction by evaluation of sella turcica on skull radiographic films and tomography are being replaced by direct visualisation of the gland with CT and MRI[5,6]. The revolutionary advance that have occurred in imaging modalities of the brain provide extensive details of anatomical relationship and have led to an increased

Corresponding Author:
Dr GS Rai
Professor and HOD,
Department of Radiodiagnosis,
People's College of Medical Sciences and
Research Centre,
Bhanpur, Bhopal - 462037
Phone No.: 9926885293
E-mail: drgarjesh_rai@yahoo.com

detection rate of pituitary lesions. The advent of dynamic contrast MR imaging has been helpful for diagnosis and treatment of pituitary lesions. MRI also helps to know nature, extent, operability of tumour and surgical approach.

As suggested by clinical signs and symptoms, appropriate imaging of the hypothalamic-pituitary axis is based on specific endocrine testing. Thin-section (2-3 mm) multiplanar MR with a small field of view obtained before and after contrast administration, including dynamic as well as static sequences, is the best imaging procedure for hypothalamic-pituitary axis abnormalities. CTA, MRA, DSA, and petrosal sinus sampling are supplemental techniques in selected cases. Contrast-enhanced CT occasionally facilitates diagnosis of neuroendocrine abnormalities but is less sensitive than MR. Bone CT may be helpful in depicting the extent of bony involvement with invasive adenomas or differentiating lesions that arise in the basisphenoid.

MRI is the primary imaging method for the study and characterization of normal anatomy and pathological process in this region[5,6,7]. We have here in the radiologic finding of pituitary lesions of the cases which were diagnosed in the Radiodiagnosis Department of People's College Medical Sciences & Research Centre, Bhopal and to assess the capability of MRI in diagnosis of pituitary lesions.

CASE PRESENTATION: *MRI IMAGING*
Case 1:-

A 7 years old child came to medicine OPD with the complaints of headache on/off since last 1 month and visual disturbance for last 3 weeks. Patient was referred to the department of radiodiagnosis for MRI brain to diagnose any intracranial pathology.

MRI brain finding reveals a well-defined solid-cystic heterogeneous mass lesion measuring (2.2x2.5x4.0 cm) seen in supra sellar region (Figure 1A). The solid portion of mass seen on pituitary gland measures of size 1.2 cm x1.06 cm. On T1WI, it appeared heterogeneously iso to hypo intense and on T2WI/FLAIR picture, intermediate to hyper intense (Figure 1B) with heterogenous post contrast enhancement.

Opinion: MRI study of brain reveals a well-defined predominantly cystic mass lesion in suprasellar region showing areas of calcification and mild heterogeneous post contrast enhancement. Above imaging features are suggestive of craniopharyngioma (adamantin-omatous type).

(1A)

(1B)
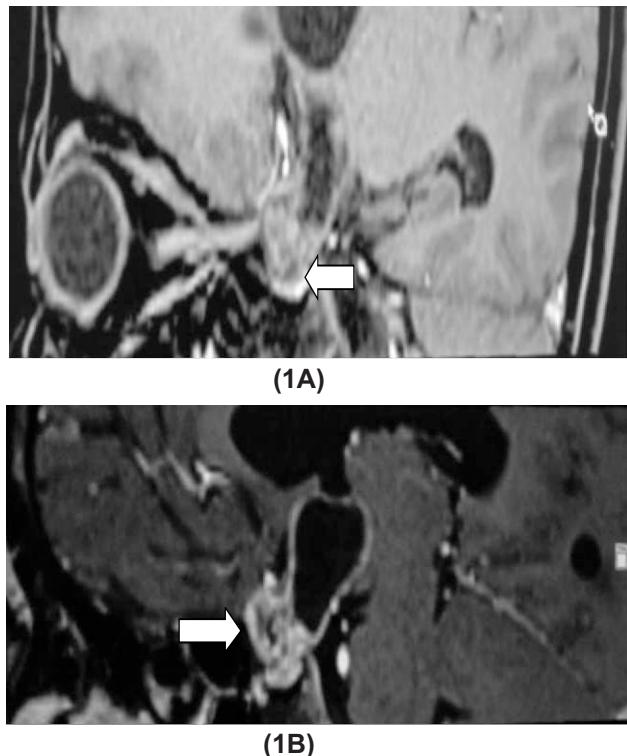
Figure 1A & 1B : MRI pre and post contrast images of the Pituitary mass, craniopharygioma discussed in Case 1.

Case 2:-

A 17 year old male, with complaints of inability to gain height with increasing age since last 5 years and markedly decreased vision since last 6 weeks.

MRI brain revealed a large well defined avidly enhancing 'figure of 8' appearance soft tissue mass in pituitary fossa causing widening of the sella with the suprasellar and right parasellar extension (Figure 2A). There were also few non enhancing areas noted within the mass with multiple small areas of blooming in GRE suggestive of focal haemorrhages (Figure 2B). It appears that mass is encasing internal carotid artery at its bifurcation with posterior communicating artery and causing invasion of right cavernous sinus (Figure 2C & 2D). Optic chiasma is markedly compressed and displaced postero-superiorly, predominantly left side. In superior extension mass is extending up to 3rd ventricle with mild indentation with no evidence of hydrocephalous at the time.

Opinion: A large 'figure of 8' appearing avidly enhancing sellar mass with suprasellar and right parasellar extention. The findings are in favour of pituitary macro adenoma.
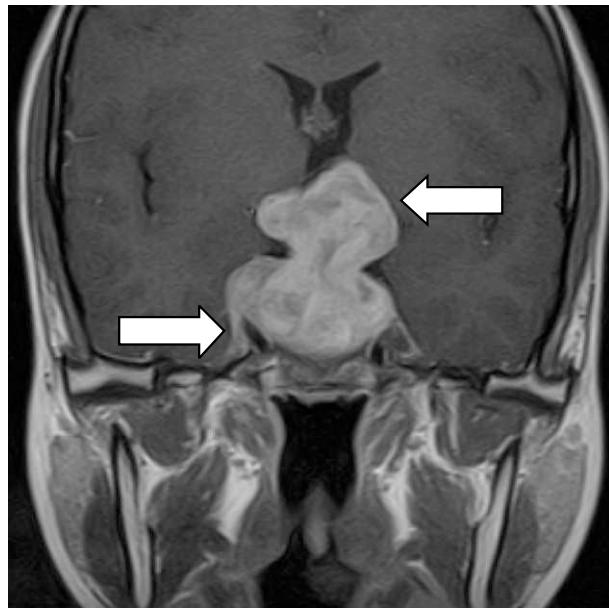
2 A

Figure 2 A : MR coronal FLAIR images showing Pituitary mass lesion discussed in Case 2.

2 B

Figure 2 B : MRI axial GRE images of the Brain showing pituitary lesion discussed in Case 2.

2 C

2 D
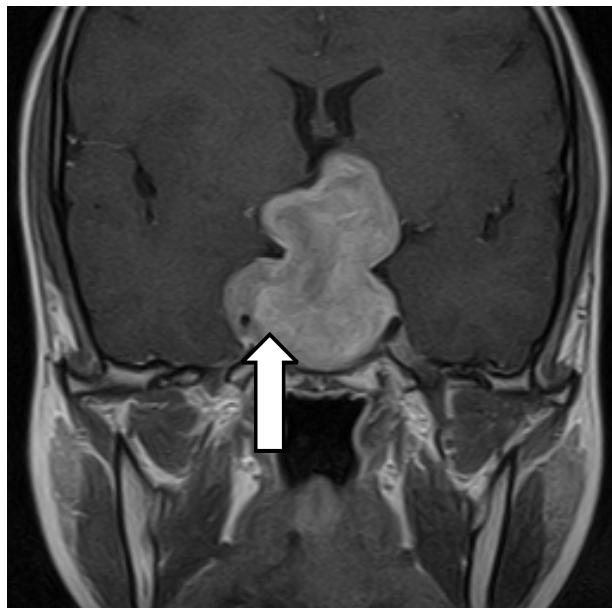
Figure 2 C & D : MRI coronal and axial T2WI images of the Brain showing pituitary lesion discussed in Case 2.

Case 3:-

A 31 year old female with the complaints of headache, dizziness, blurred vision since one month on and off was referred to Department of Radiodiagnosis for MRI brain to rule out any intracranial pathology.

MRI findings of pituitary gland show a small nodule of size 5x4 mm in left half of anterior lobe (Figure 3A & 3B).

Opinion: A small nodule is noted in anterior lobe of pituitary in left half suggestive of micro adenoma. Rest of the brain is normal in morphology and signal intensity.

Case 4:-

A male 32 year old, with the complaints of fatigue, headache and blurred vision since 2 month on and off was referred to Department of Radiodiagnosis
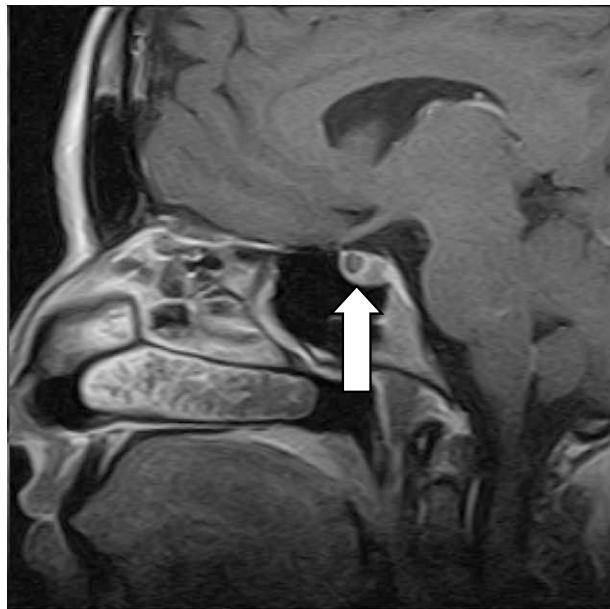
3 A

3 B

Figure 3A & 3B: MR saggital and coronal images of the Brain showing pituitary microadenoma as discussed in Case 3.

4 A
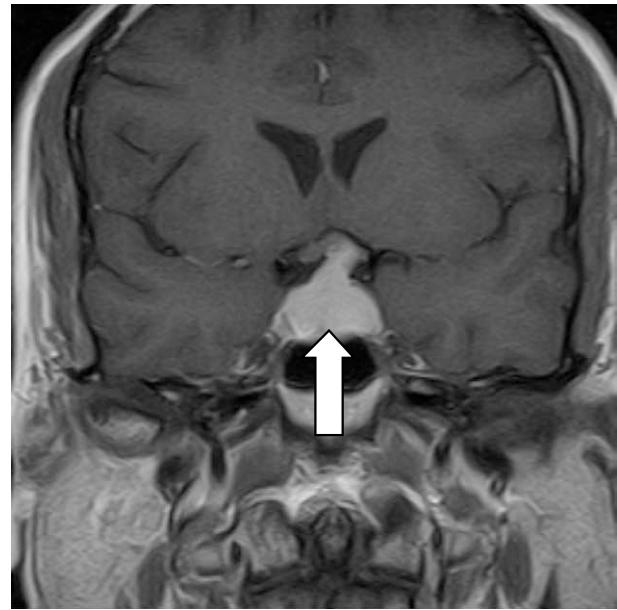
4 B

Figure 4A & 4B : MR Saggital and coronal images of the Brain shows pituitary mass lesion discusssed in Case 4.

for MRI brain to diagnose any intracranial pathology.

MRI findings shows that sella was widened. Predominantly cystic lesion of size 2.5 x 2.4 x1.8 cm. (CC x TR x AP) was seen in sella with mural nodule of 6x5 mm size (Figure 4A). The lesion was indenting left half of optic chiasma. No parasellar extension was seen and pituitary stalk was deviated towards left side (Figure 4B).

MR imaging appearance favours possibility of cystic/necrotic transformation of previous macro adenoma with haemorrhage.

Case 5:-

A male patient of 22 years old, complaints of headache, dizziness and blurred vision since 3 month and learning disability. MRI brain finding reveals

5 A

5 B
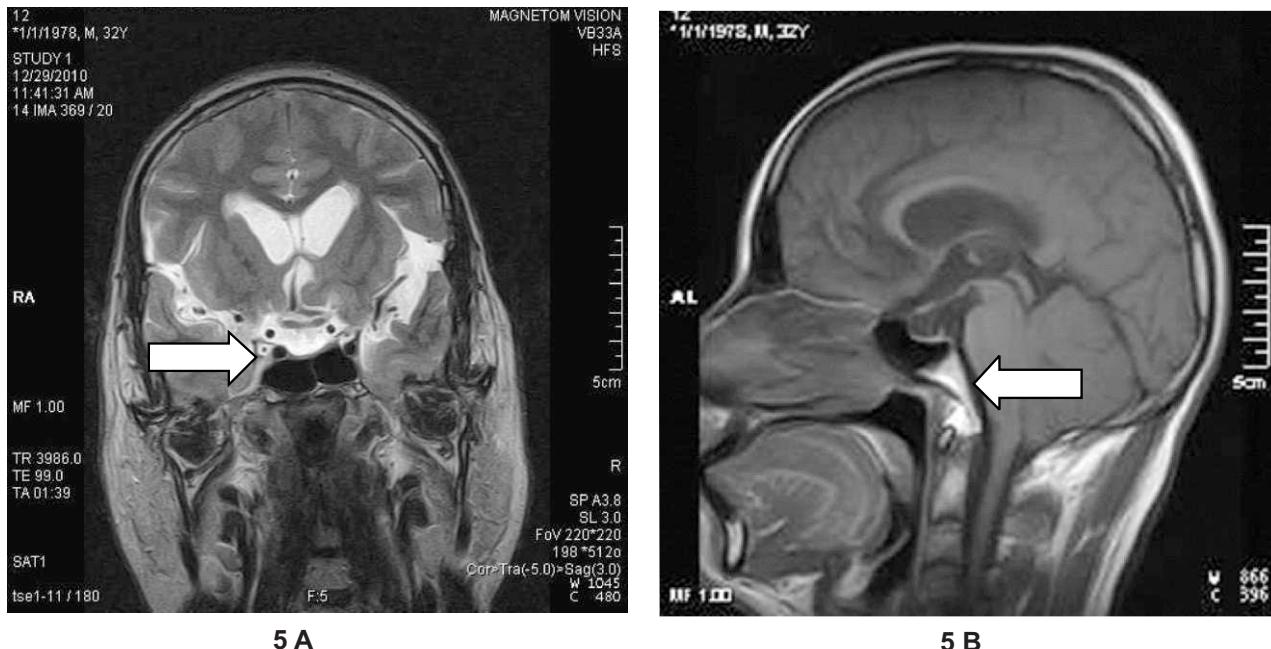
Figure 5A & 5B : MRI coronal T2WI and saggital flair images of the Brain showing empty sella as discussed in Case 5.

Empty sella measuring 11x17x10mm. (Figure 5A & 5B)

Opinion: MRI Brain with pituitary reveals empty sella. Tortuous optic nerves with prominent peri-optic nerve sheath.

DISCUSSION:

Pituitary imaging is essential tool in order to confirm the diagnosis and for differential of other sellar lesions. An empty sella (ES) is an arachnoid-lined, CSF-filled protrusion that extends from suprasellar cistern to the sella turcica through diaphragm sellae. ES is rarely completely 'empty'; a small remnant of flattened pituitary gland is almost always present at the bottom of the bony sella, even if it is in apparent on imaging studies. Therefore, the term 'partially empty sella' is anatomically more accurate. Imaging observations of empty sella suggest intrasellar CSF with flat thin pituitary gland reminent in the sellar floor. On MR Findings, the intrasellar fluid behaves exactly like CSF on T1- and T2WI and suppresses completely on FLAIR. DWI shows no diffusion restriction.

Craniopharyngioma (CP) is a benign, often partly cystic sellar/suprasellar mass that probably arises from epithelial remnants of Rathke pouch. Clinically it was occurs in > 50% of pediatric suprasellar neoplasms, also found equally in adults and have peak in 5-15 years and 40-55 years in children and adults respectively. Papillary type ismuch more common in adults. Slow growth and recurrence are common with rare malignant transformation. MRI imaging shows variable signal on T1WI and hyperintense on T2/FLAIR with Enhancement (nodular or rim). MRS shows large lipid-lactate peak[8].

Pituitary adenomas consist of secretory cells that secrete pituitary hormones. Microadenomas are tumors of size upto 10 mm in diameter, while masses more than 10 mm are considered as macroadenomas. On MRI, it is isointense with cortex and heterogeneous signal intensity is common due to cystic and haemorrhagic changes of adenoma. Heterogeneous enhancement of microadenomas seen is with dynamic T1 C+. Historically, before the advent of CT scan or MRI, the pituitary was imaged with lateral skull x-rays to detect remodelling of the pituitary fossa. However, the radiographic size of sella is not a sensitive predictor of pituitary gland abnormality. Thus the plain radiographs were replaced by CT imaging. Although CT was able to detect up to 80-90% of microadenomas (between 8-10 mm in size) and other lesions while radiologists faced a difficulty in identifying smaller nodules[9].

Hence, CT is replaced by Magnetic Resonance Imaging which is now the modality of choice in the imaging of pituitary lesions due to its superior soft tissue contrast, multiplanar imaging and minimum ionizing radiation. In addition, MRI also

provides valuable knowledge about the anatomy of the gland with neighbouring structures and helps in decision to plan surgery[10,11].

The optimum enhancement in healthy pituitary tissue and microadenomas is achieved in dynamic imaging within 30-60 seconds after IV bolus injection of contrast medium, whereas most microadenomas tend to be relatively non-enhancing lesions within an intensely enhancing pituitary gland. Dynamic MRI is also useful for residual/recurrent tumour differentiation.

The information provided by MRI in cases of pituitary lesion is highly useful for physician treatment and surgeon for planning of treatment and operability. In most cases, the tumours remain cytologically benign inspite of their invasive behaviour since the intracavernous cranial nerves occupy the lateral position in the sinus and clinical signs of cavernous sinus invasion occurs late[12]. It is crucial to analyze the encroachment of the cavernous sinus, and at this stage complete surgical removal of the tumor is difficult, so in these cases, radiation therapy is recommended. On MR imaging, the most reliable sign of cavernous sinus invasion is tumour encasing the carotid artery.

Majority of the macroadenomas appear isointense on T1WI and T2WI and show homogenous early enhancement on post contrast study. Those showing cystic degeneration / necrosis are seen to have hyperintense signal intensity on T2WI, with a non-enhancing area within, on post contrast images. Soft adenoma (easy to operate) appears hyperintense in diffusion weighted images with low ADC value.

Hard adenoma (difficult to operate by Endoscopic Trans-sphenoidal technique) appears hypointense on DWI and shows high ADC values[13]. In addition, DWI also helps in early detection of pituitary apoplexy (Haemorrhage/infarction). Thus, DWI should be a part of MRI study for evaluation of pituitary adenoma prior to surgery.

Recent advances in MRI evaluation of pituitary adenoma include Magnetization Transfer (MT) imaging, MR spectroscopy and Intraoperative MRI (IMRI). MT images also help in post-operative assessment of residual tumour (high signal on MT images) when findings are negative on routine MRI sequences[14]. Primary role of MR spectroscopy is to differentiate various types of pituitary lesion. On MR spectroscopy pituitary adenoma may show a choline peak[15]. Use of IMRI during endoscopic pituitary surgery has proven to be very useful in localizing and complete resection of invasive pituitary adenoma[16].

CONCLUSION:

MRI provides excellent choice for the diagnosis of hypothalamic-pituitary-related endocrine diseases/disorders. This not only assists in the diagnosis of all these lesions but also provides valuable information of anatomical relationship of the pituitary gland to the surrounding tissues. MRI also serves as a guide for surgical approach.

MRI is also an important method for assessing patient's treatment conservatively and post-operatively, as well as for evaluating sensitivity to therapy. We assume that an experienced multidisciplinary team is ideally suitable for pituitary masses to be characterized and monitored. Immediate emergency surgery should be discouraged, giving priority to a detailed investigation and close supervision of the causative factors of pituitary lesions.

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Near-Miss Cases: Case Series of Intensive Obstetric Care

Trupti Soni, Gurpreet Kaur

Department of Obstetrics and Gynecology, People's College of Medical Sciences and Research Centre, Bhopal

ABSTRACT

A near miss case is defined as a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy. Reviewing near miss cases provides us the significant information about the delay. Overcoming the challenge, identification and management of near miss cases is complement to maternal health. Case: 1: G3A2 at 14 weeks with missed abortion with phaeochromocytoma. 2: G4P3L3 at 40 weeks 3 days with ruptured uterus with haemorrhagic shock with severe anemia 3: G3P1L0A1 at 35 weeks with history of uterine rupture and perforation. 4:Elderly primi at 37 weeks with HELLP syndrome. In near miss cases, if proper diagnosis is made and with immediate intervention and ICU care is provided, patient can be saved.

KEY WORDS: anemia, obstetrics near miss cases, perinatal, phaeochromocytoma

INTRODUCTION:

A near miss case is defined as a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy[1]. Overcoming the challenge, identification and management of near miss cases is complement to maternal health[2].

CASE PRESENTATION:

CASE 1:

A 26 yr old G4P3L3 with rupture uterus in hemorrhagic shock with severe anemia with IUFD was referred with history of 9 months amenorrhoea. The findings were as follows: pulse- 130/min, hypovolumic thread, BP- 70/40 mmhg, catheter in situ – 20 ml high coloured, POG- 40 weeks, history of: previous 3 FTND, on examination: semiconscious, oriented with cold clammy, skin, general condition- poor, severe pallor, per abdomen- ut~ 28 wks, flanks full, uterine margins cannot make out, FHR- absent, local examination- swelling over vulva and per vaginum- hot and dry vagina, os fully dilated,

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Corresponding Author:
Dr Gurpreet Kaur,
Professor,
Department of Obstetrics and Gynecology,
People's College of Medical Sciences and
Research Centre,
Bhanpur, Bhopal - 462037
Phone No.: 9826740484
E-mail: kaurgauri2@yahoo.co.in

Presenting part- 0 station, caput present, membrane absent.

MANAGEMENT:

Emergency exploratory laprotomy was done. Per operative- Anterior wall uterine rupture with left lower segment extending upto left broad ligament; Hemoperitoneum~3 litres; Still born child 3 kg; Bladder integrity maintained. Subtotal caesarian hysterectomy was done. 4 units PRBC, 1 unit whole blood, 4 units FFP given. Post operative: Patient discharged after 21 days.

CASE 2:

A 28 yrs G3P1L0A1 at 35 weeks with history of uterine rupture and perforation was attended. Obstetric history -First FT LSCS for obstructed labour with rupture uterus 8yrs back(still birth). Post-op period was uneventful. Second second trimester MTP done at 16 weeks with history of some instrumentation leading to perforation 7yrs back, managed conservatively. Now Patient at 35 weeks unbooked in labor. The findings were as follows: General examination: GC fair, Pulse 100bpm, normovolumic, regular, BP 120/80 mm Hg, Pallor present. Per abdomen: Abdominal scar was transverse, healthy, no puckering, Ut 32wks, relaxed, reduced liqour, no scar tenderness, FHS140bpm. Per speculum: Os patulous, no bleeding, no leaking. Per vaginum: Os patulous, cervix uneffaced, head high up, no leak, no show.

Figure 1: Anterior wall uterine rupture.

Figure 2: Rent present on fundus which was involving whole myometrial thickness (old perforation).

MANAGEMENT:

Emergency caesarean section was taken. Per operative--flimsy peritoneal adhesions were present.-well formed lower uterine segment.-Previous scar thinned out-delivered female baby of 2kg with Apgar score of 7 and 8, alive and healthy with mother.-placenta was adherent (accreta).

Uterus was exteriorized and there was incidental finding of 2.5×2.5 cm circular rent present on fundus which was involving whole myometrial thickness (old perforation). Rent was repaired, uterus closed and tubal ligation done.

CASE 3:

A 20 yrs primigravida at 29 weeks with severe anemia, hepatitis, severe sepsis, multiorgan dysfunction syndrome. She complained of breathlessness 8-10 days yellow discolouration of eyes 10-12 days. The findings were as follows: On examination: conscious , oriented severe pallor ,
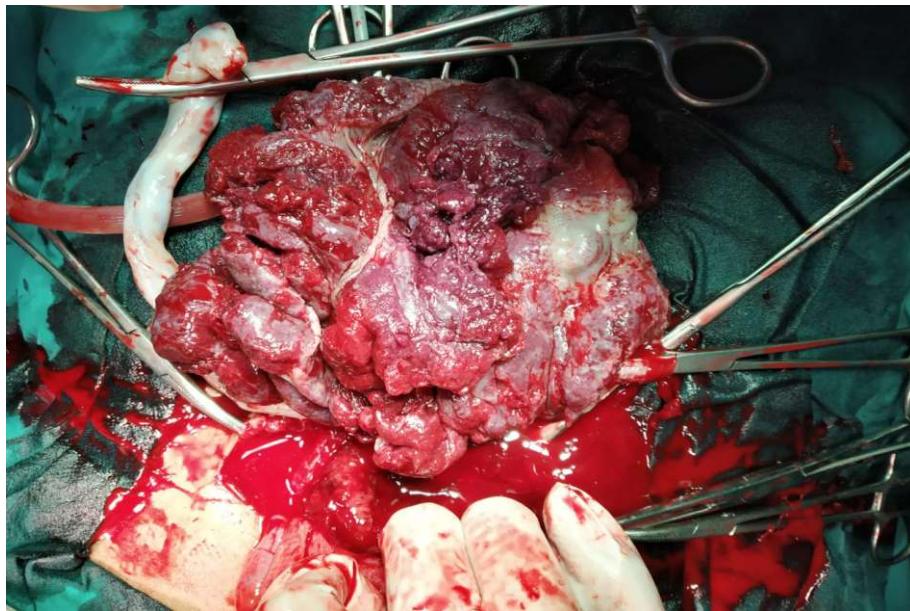
Figure 3: Adherent placenta (accreta).

INVESTIGATIONS:

Test	22-11-18	25-11-18	27-11-18
Hb	2.2	4.5	11.2
TLC, Platelet	87000, 2.9 lacs	35000, 180000	26000, 140000
APTT, PT, INR	37/35, 21/15, 1.4	36/35, 17/15, 1.1	
Serum protein/ Alb/Glob	7.55, 3.34, 4.21	6/3/3	
TB	5.02	3.3	
DB/IB	3.79/1.23	1.9/1.3	
SGOT/SGPT/ALP	106.5/48/292	26/39/166	
Sr Na+/Sr K+	141/5.63	145/2.76	134/3.83
BU/Creat	40.3/1.48	90/1.35	
HbsAg/ HCV/HbeAg	NR/NR/NR	NR/NR/NR	NR/NR/NR

icterus present, pedal oedema present, pulse- 104/ min and BP- 110/80 mm Hg, R/S chest clear. Per abdomen: ut~28 weeks, FHS present.

HOSPITAL COURSE:

Admitted in ICU in joint care with Medicine Department. Intubated and nor-adrenaline infusion was given. Extubated after 24 hrs, shifted on oxygen. After 24 hrs of admission, IUFD occurred. Induction and Preterm vaginal delivery interval was 7 hrs. Received 6 unit PRBCs. Got discharged after 7days.

CASE 4:

G3A2 AT 14 weeks with missed abortion with phaeochromocytoma. She was admitted with 4 months amenorrhoea Palpitations, perspiration, epistaxis, nausea and blood pressure of 200/110 mm Hg. Investigations: Her USG showed single intrauterine pregnancy of 14wks 3 days with absent fetal heart rate indicating missed abortion. The MRI scan of the abdomen showed a 5.1*4.8*6 cm^3 T1Hyperintense T2 Hypointense enhancing mass arising from the right adrenal gland. 24-hour urinary Chromogranin A (203.3 ng/ml), Metanephrine (78.47 ug/g), Normetanephrine (10562.71ug/g) were elevated

MANAGEMENT:

She was started on prazosin (10 mg BD), Labetalol (100 mg TDS) and later propanalol (40mg BD). MTP was done by Prostaglandin (Dinoprostone gel and tab Misoprostol) administration. Induction abortion interval was 24 hours. Following adequate

control of her blood pressure, Right adrenalectomy was performed. Her BP normalized postoperatively and antihypertensive medications were continued. The 24-hour urinary catecholamines and metanephrines done three months later were normal.

DISCUSSION:

This study assessed the clinical spectrum of these patients in much depth. The term near-miss describes a serious adverse event whereby death did not occur either due to luck or prompt adequate management[3]. Results of critically ill patients like with severe obstruction and its complications depends on various factors like prior health of patient, physiological stores, severity of disease and quality of care with adequacy[4,5,8]. Severity affects risk of disease progression itself and quality of care like timely intervention, appropriateness and comprehensiveness. Since maternal deaths and near miss cases share similar features, they can be used to overcome obstacles and provide information regarding worsening of complications. Therefore, valuable information on obstetric care can be obtained through near miss cases. In present scenario with so much of antenatal supervision and modern facilities, still the labour in remote places are unattended and going into obstructed labour which leads to increasing operative intervention and increasing maternal and perinatal morbidity and mortality. Illegal abortions also lead to further obstetric complications in subsequent pregnancies[6,7]. So, adequate screening, regular antenatal check-ups and timely management can reduce maternal and neonatal morbidity and mortality[9].

CONCLUSION:

In near-miss cases, if proper diagnosis, immediate intervention and ICU care is provided, the patients can be saved.

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Dentinogenic Ghost Cell Tumor

*Taufique Anwer, **Rajan Kumar Singh, ***Supriya Naren, ****Kumar Abhisek, ****Anamika Sinha, *****Trapti Gupta

*Department of Dentistry, Glocal University, Saharanpur, Uttarpradesh, India, **Department of Oral Pathology and Microbiology, Bareilly International University Institute of Dental Sciences, Bareilly, ***Department of Oral Medicine & Radiology, IDS Bareilly International University, Bareilly ****General Practitioner, Dr. Haque Dental & Health Center, Muzaffarpur, Bihar, *****General Practitioner & Consultant, Department of Conservative and Endodontics IDS Bareilly International University, Bareilly

ABSTRACT

Context: Dentinogenic Ghost Cell Tumor (DGCT), a solid variant of the Calcifying Odontogenic Cyst (COC), is an uncommon odontogenic neoplasm occurring predominantly in later life with locally aggressive behavior characterized by ameloblastoma-like islands of aberrant keratinization of odontogenic epithelium in the form of ghost cells in association with dysplastic dentin. It accounts for only 2–14% of all COCs. Case Report: We report a case of 21 year old male patient with chief complaint of swelling in left upper back tooth region since 4-5 months and histopathologically characterized by ghost cell with strands and cluster of odontogenic epithelium in mature connective tissue stroma. associated with in dentinoid formation are some areas. Conclusion: The present case of 21-year-old male was diagnosed as DGCT, a timorous form of COC, due to its characteristic histological features; numerous ghost cells and dentinoid material.

INTRODUCTION:

The former description of dentinogenic ghost cell tumor (DGCT) was proposed by Fejerskov and Krogh[1] in 1972. They used the term 'calcifying ghost cell odontogenic tumor.' In 1981, Praetorius et al.[2] recommended the term 'dentinogenic ghost cell tumor.' They suggested this term due to the formation of dentinoid in relation to the epithelial islands, which was a very prominent trait and because the ghost cells were found to be of altering degrees. The dentinogenic ghost cell tumor (DGCT) is an infrequent odontogenic neoplasm, regarded as a solid alternative of the calcifying odontogenic cyst (COC). Only 2–14% of COC are solid tumors and are considered to be DGCTs[3]. It is characterized by ameloblastomatous odontogenic epithelium, existence of ghost cells and dentinoid material. Chiefly seen in older age group and can ensue either as a central (intraosseous) lesion or peripheral (extraosseous in the soft tissues) lesion[4].

The calcifying odontogenic cyst (COC) was first described in 1962 by Gorlin *et al*. as a split entity of odontogenic origin[5]. COC, also referred to as calcifying ghost cell odontogenic cyst (CGCOC), is a varied lesion active either as cystic or solid alternative[2]. Widely held of CGCOC (85%) are cystic in nature, and clinically may come about as a central (85%) or peripheral (15%) lesion. Central lesions frequently present as asymptomatic bony expansion, despite the fact that peripheral lesions are seen as sessile of pedunculated smooth surfaced masses[6]. Due to the piece of evidence that all CGCOC lesions are not cystic, and the genetic behavior is often not steady with a cyst, there has constantly been a storm as to whether COC is a cyst or a tumor. The dentinogenic ghost cell tumor (DGCT), regarded as a solid alternative of the COC. DGCT can show evidence of either a benign or a malignant outline or can endure malignant transformation[7].

The existing WHO classification of 2005 recognizes DGCT as the early solid variant of COC (type II).

Corresponding Author:
Dr Kumar Abhisek
General Practitioner, Dr Haque Dental & Health Center,
Muzaffarpur, Bihar-842002
Phone No.: 9997681172
E-mail: docromantiko.ka@gmail.com

CASE REPORT:

A 21 year old male patient reported to the outpatient department of Oral Pathology & Microbiology, Institute of Dental Sciences, Bareilly, with chief complaint of swelling in left upper back tooth region since 4-5 months which gradually

Figure 1: Solitary, exophytic, sessile, soft tissue mass, pinkish red in color present on left maxillary posterior tooth region.
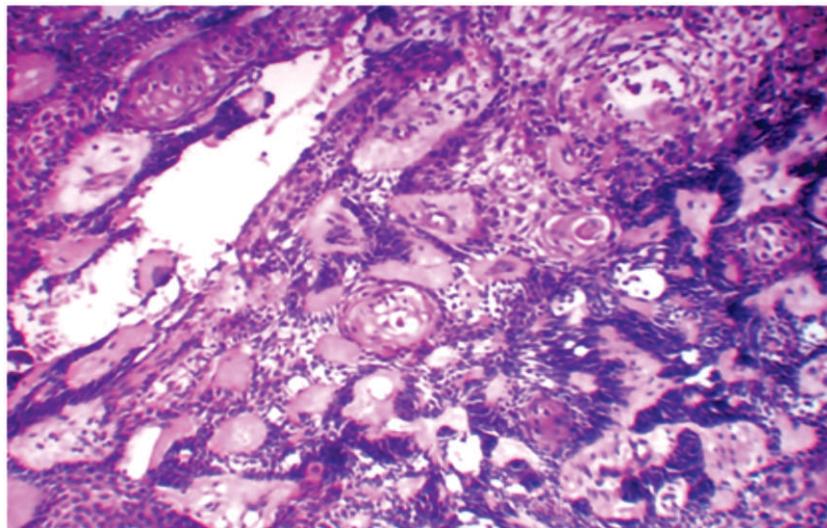

Figure 2: (Under Scanner view) Two pieces of tissue with odontogenic epithelium proliferating predominantly in plexiform pattern with mature connective tissue stroma in background. In some areas follicles and islands of odontogenic epithelium are also visible.

increased to the present size. The patient also had habit of keeping tobacco quid with lime and extraorally no obvious findings were noted. On intraoral examination a solitary, exophytic, sessile, globular soft tissue mass was present on maxillary posterior tooth region, extending mesiodistally from 23 to 24 regions, and measured 1 cm in its greatest dimension. (Figure. 1) The color of the overlying mucosa was pinkish red. The surface was irregular with an area of ulceration, covered with necrotic slough. The growth was firm in consistency and non-tender on palpation and was provisionally diagnosed as reactive or neoplastic growth. Histopathologically it is characterized by ghost cells with strand and cluster of odontogenic

epithelium in mature connective tissue stroma associated with in dentinoid formation some areas (Figure 2).

DISCUSSION:

According to the WHO[7] the spectrum of odontogenic ghost cell tumors comprises DGCT, calcifying cystic odontogenic tumor (CCOT) and the ghost cell odontogenic carcinoma (GCOC). Based on a research of 215 COCs carried out by Buchner et al, who found that COC represents 1–2% of all odontogenic tumors and of these only 2–14% were solid tumors, considered to be DGCTs. DGCT is the solid, clinicopathologic variant of CCOT as COC
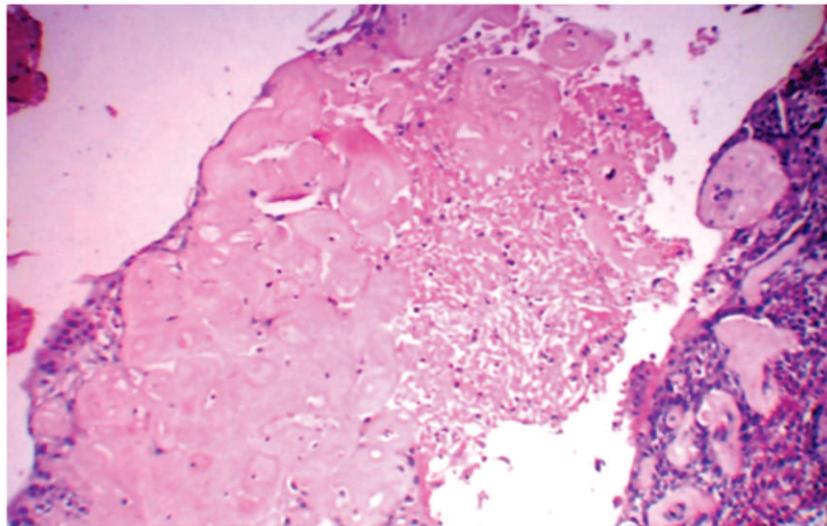
Figure 3: (Under Low power View) In some areas follicles and islands of odontogenic epithelium are visible with areas of ghost cells and mass of dentinoid material.
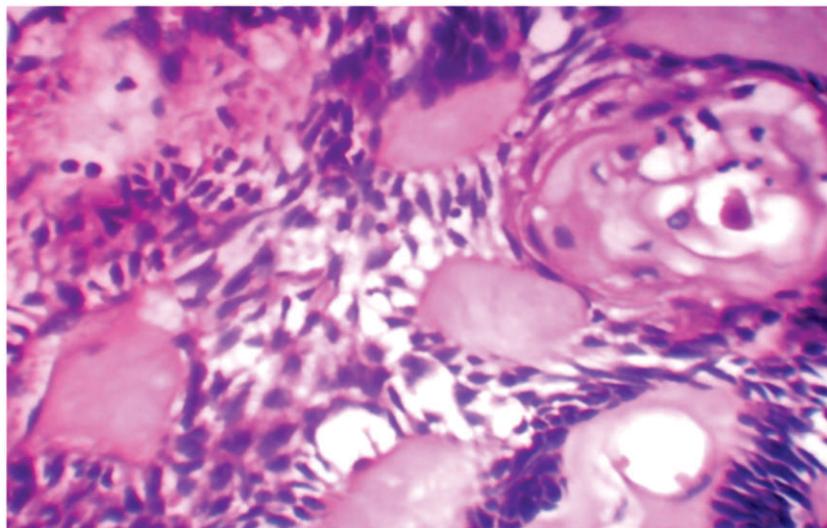
Figure 4: (Under Higher magnification): The odontogenic epithelium in some places, show cuboidal to columnar cells with dark hyperchromatic nucleus arranged in palisaded pattern (suggestive of ameloblast like cells). Associated stellate reticulum like tissue is appreciated. In some areas, ballooned and ovoid eosinophilic cells suggestive of "ghost cells" are visible. Few ghost cells show nuclear remenants with blurred outlines.

which was first described by Gorlin et al.[8] However, Fejerskov and Krogh[1] 1972 were of the opinion that the term COC is not entirely appropriate, for various reasons given below and suggested the term "calcifying ghost cell odontogenic tumor.':

a) The presence of the ghost cells which may subsequently show calcification; b) The possibility of cystic degeneration taking place in the center of proliferating epithelial islands rather than epithelial changes developing in a preexisting cyst wall; c) Growth proliferative potentiality of some lesions giving rise to lesions of considerable size.

In 1981, Praetorius et al.[9] suggested the term

"DGCT" because of the presence of ghost cells and abundant dentinoid material. The WHO, in 2005, defined DGCT as, 'A locally invasive neoplasm characterized by ameloblastoma like islands of epithelial cells in a mature connective tissue stroma. Aberrant keratinization may be found in the form of ghost cells in association with varying amounts of dysplastic dentin.'[7] DGCT may occur as an intraosseous lesion (Type 1, 83%) and less commonly as an extraosseous peripheral lesion arising in the gingiva or alveolar mucosa (Type 2, 17%)[4]. The age may range from 12 to 75 years (mean 50 years) with slight male predilection. The present case was seen in

a male patient aged 21 years. The peripheral type occurs significantly later in life than the central type[4]. DGCT may occur in any tooth bearing area or the edentulous region of the jaws[9,10].

Intraosseous lesions predominantly occur in first molar to canine region[3]. The present case was noted in maxillary left posterior region. The size of the intraosseous DGCT varies from 1 to more than 10 cm in diameter and is usually asymptomatic. The clinical signs of intraosseous DGCT variants may include expansion of the jaw, clinically visible swelling and obliteration of the maxillary sinus or infiltration of the soft tissues. Swelling can be painful or painless and occasionally accompanied by pus discharge, tooth displacement or mobility[11]. The present case which represented clinically as a soft tissue overgrowth is not a common finding.

To the best our knowledge, only one case with similar findings has been reported[10]. The DGCT can be asymptomatic and can also present itself as coincidental radiographic finding during routine patient examination. It appears radiographically as a radiolucent, radiopaque or mixed lesion depending on the amount of calcification. Lesions can be Unilocular or multilocular with either well-defined or ill-demarcated margins. Root resorption, displacement of adjacent teeth and presence of impacted teeth have been reported[10,11].

The predominant location for peripheral type is posterior portion of mandible (73%) and appears as exophytic nodules confined to the gingival mucosa in dentate patients or the alveolar mucosa in edentulous patients[4]. This lesion may be confused with reactive or inflammatory lesions of gingiva, such as peripheral giant cell granuloma, pyogenic granuloma, irritation fibroma, epulis or parulis[12]. Very often it is of 0.5 cm to 1 cm in size with little variations[8]. Mild erosion or the saucerisation of the underlying cortical bone may be seen in 20% of cases[9].

HISTOGENESIS:

The histogenetic derivation of DGCT has been attributed to cell rests of serre or the surface epithelium but currently remains unclear[13]. Missense mutation on codon 3 (ACT → TCT), i.e., threonine to serine of β catenin gene suggests that β catenin plays an important role in the tumorigenesis of DGCT by an improper differentiation process coordinated by Wnt signaling pathway[14].

CONCLUSION:

DGCT is an uncommon odontogenic neoplasm, regarded as a solid variant of the COC. Only 2–14% of COC are solid tumors considered to be DGCTs. A case of central DGCT in a 21 year old male patient with clinical presentation as a soft tissue growth over the alveolar ridge is reported here.

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